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The U.S. Farming Sector Entering the 1990's

Twelfth Annual Report on the Status of Family Farms

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The U.S. Farming Sector Entering the 1990's: Twelfth Annual Report on the Status of Family Farms. Edited by Thomas A. Carlin and Sara M. Mazie. Agriculture and Rural Economy Division, Economic Research Service, U.S. Department of Agriculture. Agriculture Information Bulletin 587.

Abstract

Farm numbers continued to decline throughout the 1980's as they have since 1935. The U.S. farm sector will enter the 1990's in a much improved financial position after the financial difficulties of the early and mid-1980's. Small farms dominate in farm numbers, but a relatively few large commercial farms produce most U.S. food and fiber. Almost all U.S. farms are family-owned businesses. Today's farmers who hope to continue into the 21st century must master the technical aspects of farm production and marketing and also understand the implications for their farm businesses of changes in Federal monetary and fiscal policy, international exchange rates, environmental policy, tax policy, and emerging technologies.

Keywords: Family farms, structure, commodity programs, conservation policy, taxes, credit, technology, trade.

Preface

This publication is based on the 12th annual report to the Congress on the status of family farms. These reports have been submitted to Congress in accordance with the Food and Agriculture Act of 1977 (section 102), the Agriculture and Food Act of 1981 (section 1608), and the Food Security Act of 1985 (section 1441). The principal authors of this report are Nora Brooks, Thomas A. Carlin, Douglas Duncan, Ron L. Durst, Richard M. Kennedy, John Kitchen, John McClelland, Ralph Monaco, C. Tim Osborn, and Donn Reimund. Judith Z. Kalbacher prepared the appendix tables.

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Summary

The U.S. farm sector enters the 1990's in a much improved financial position after the difficulties of the early and mid-1980's. Today's farmers who hope to continue farming into the 21st century, however, must master the technical aspects of farm production and marketing and also understand the implications for their farm businesses of changes in Federal conservation policy, tax policy, credit policy, technology, macro-economic policy, and agricultural trade policy.

Structure of the U.S. farm sector: The farm recession of the 1980's did not substantially alter the four-decade trend toward fewer, larger, more capital-intensive farms. Small farms dominate numerically, but a few large commercial farms produce most U.S. food and fiber. Almost all U.S. farms are family-owned businesses. The proportion of farms that are financially vulnerable today is half what it was in 1985. Farmland prices have stabilized and are rising in many parts of the United States. Favorable farm financial forecasts for 1990 point to a financially stronger farm sector going into the 1990's.

Commodity programs: Since 1982, the Federal Government has transferred almost \$14 billion per year from taxpayers to farmers who grow wheat, rice, feed grains, and cotton. Direct Government payments and net non-recourse commodity loans represented 5 percent of total U.S. gross cash farm income in 1988, but only about 36 percent of U.S. farmers actually participated in these programs. Participation is highest in the Northern Plains, Corn Belt, and Lake States and among cash grain and cotton producers. The average direct payment per recipient in 1988 ranged from \$1,400 for farms with less than \$10,000 in annual sales to \$56,700 for those with sales of \$500,000 or more.

The Food Security Act of 1985 has lowered Federal price support levels and provided export enhancements. These programs have helped the United States recapture some of its previous share of world markets and are reducing future Federal Government budget outlays.

Conservation provisions: The Food Security Act of 1985 explicitly ties agriculture policy to conservation goals and programs. The conservation reserve program (CRP) encourages farmers to remove highly erodible land from production and to plant it in permanent ground cover. By February 1989, farmers had enrolled about 30 million acres in the CRP out of a potential total of 70 million acres of eligible cropland.

The law also withholds price and income support payments and other benefits from farmers who fail to provide a soil conservation plan for their highly erodible

cropland or who convert wetlands to cropland. Taken together, these provisions will reduce both potential commodity surpluses and soil erosion problems that could endanger the productivity of the Nation's farmland and environmental quality.

Tax policy: Federal income tax provisions encouraged investment in agriculture as a means of sheltering income for many years. The Tax Reform Act of 1986 reduced the importance of Federal income taxes in investment and production decisions. Thus, future investment decisions will probably be based more on economic returns and less on tax benefits. For some farm commodities, this change should mean reduced investment, lower production, increased product prices, and higher total revenue for producers.

Credit policy: Debt-financed farm expansion during the 1970's and early 1980's contributed to the financial stress that many farms faced in the mid-1980's. Since then, farmers used portions of their Government payments to reduce their debt that peaked at \$207 billion in 1983. Farm lenders have also written off bad loans as adjustments to the farm recession conditions of the mid-1980's.

Today's farmers are more cautious about assuming more debt and farm lenders are using more conservative lending policies compared with the late 1970's. Near-term prospects for agricultural credit availability have improved especially for low-risk borrowers. Lenders can satisfy a significant expansion in credit demand by creditworthy farmers. However, with improved efficiency in agricultural credit markets and their fuller integration with national financial markets, farmers will have to compete more with nonfarm borrowers to obtain funds for expansion and operating needs.

Technology developments: New technology resulting from plant and animal research, in concert with economic forces, has changed farm structure. Bovine growth hormone (bGH) and porcine growth hormone (pGH) are biotechnology's research products closest to leaving the laboratory and arriving at the farm. They offer the potential for significantly increased dairy and pork production. More efficient producers will probably benefit most from using these growth hormones, encouraging the trend in U.S. agriculture toward fewer, larger, more capital-intensive farms.

Macroeconomic policy: Domestic and foreign macroeconomic policies increasingly and inescapably affect the profitability of family farms and their likelihood for survival. Throughout the 1980's, the Federal Government ran large budget deficits and the Federal Reserve

maintained a rather tight monetary policy designed to keep inflation in check. This macroeconomic policy resulted in historically high real interest rates and exchange values of the dollar in world markets that in turn encouraged more imports and reduced exports, lowered commodity prices, and raised interest costs. These developments contributed to the mid-1980's farm recession.

Federal moves to reduce the budget deficit and stabilize the economy, in concert with the willingness of major developed nations to bring down the high exchange value of the dollar in international markets, have helped improve the macroeconomic climate in the United States and restore the U.S. farm economy.

Agricultural trade policy: Agricultural protectionism, in which governments intervene in international commodity markets to promote domestic policy goals, has in-

creased around the world. If continued both here and abroad, it carries the risk of escalating conflict and uncertainty in world markets. For the United States, depending heavily on exports, the resulting instability and loss of markets create boom-or-bust cycles in which the economic well-being of less competitive farmers hinges upon the willingness of taxpayers to support domestic farm programs.

The current multilateral trade negotiations recognize for the first time that the relationship between domestic farm policy and agricultural trade policies is legitimately subject to negotiation. The negotiations provide an opportunity to make both domestic and international policies more responsive to world market conditions. If negotiations succeed in reducing trade distortions, U.S. farmers will face a more competitive trading environment, where income will depend more on market factors than on Government payments.

An Overview

Thomas A. Carlin*

Farm numbers continued to decline throughout the 1980's as they have, almost unabated, since 1935. The 1987 Census of Agriculture counted just over 2 million farms, 7 percent fewer than in 1982. While fewer in number, small farms increased as a proportion of total farms. Mid-sized farms decreased in both absolute and relative terms. The number of large farms continued to increase. This trend shows little prospect of reversing in the near future.

Virtually all farms in the United States are family-owned businesses. Fewer than 3 percent of all farms are organized as corporations, most of which are family held. Only 0.3 percent are corporations owned and operated by a unit other than a family. Single families own and operate 87 percent of all farms. Multifamily partnerships operate the remaining farms. Because almost all farms are owned and operated by one or more families, we did not define family farm for this report. Rather, the report deals with issues and institutions that are important to the farm sector and how they may affect the structure of U.S. farming. By structure, we mean how farms of different sizes and types organize natural, financial, and human resources to produce food and fiber and the distribution of income and wealth that results from that activity. Although this definition implies that farm structure is a multidimensional concept, there is no well recognized multidimensional definition of farm structure. In this report, we adopt the convention of describing farms classified by the value of farm products sold annually by the business. This approach has limitations, but it allows us to discuss the diversity of the farm sector and the effects of public policy on the sector.

We also distinguish among farms as either commercial or noncommercial. Noncommercial farms are those with annual gross farm sales of less than \$40,000. These farms individually produce relatively small amounts of farm products and provide insufficient farm income to support a family at today's living standards.

Snapshot of the Farm Sector

Most U.S. farms are small, noncommercial, and usually family owned and operated. Small, noncommercial farms produce a minor share of total U.S. food and fiber. They are typically located near more densely settled urban areas where nonfarm employment opportunities abound. They do not significantly affect the local economy's income and employment but provide an important noneconomic presence to the local area. The primary occupation of most of the operators of these farms is not farming. They typically hold a full-time nonfarm job and work part-time on the farm or are semiretired.

Small, noncommercial farm businesses often operate at a loss; that is, farm expenditures exceed receipts from commodity sales, Government payments, and farm-related income. Family well-being for these small farms depends primarily on off-farm income, and their average total income in most years is commensurate with that of all U.S. families. Earnings from a nonfarm job or retirement income are the primary source of off-farm income for these families. Small farms are also found in areas such as the interior uplands of Kentucky and Tennessee that are relatively less conducive to large-scale crop production. Thus, these farms are disproportionately livestock farms.

Most of our food and fiber is produced by very large commercial farms. Today's farming is a highly capital intensive industry. Owners of large farms typically control several million dollars of assets, primarily land and machinery. Many of the largest farms produce fruits, vegetables, and horticultural specialty crops, crops not covered by Federal price and income support programs. Most large farms are operated as sole proprietorships, but they are more likely to be organized as partnerships or corporations than are smaller noncommercial farms. However, most of these farm corporations are family held.

Farming is the dominant occupation for operators of large farms. Large farm operators' families depend primarily on farming for income, and their total average

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family income in most years is above that of all U.S. families. Families operating large farms do report off-farm income, but it is typically in the form of interest, rent, or dividends rather than earnings from a nonfarm job. Most large farms are located away from major urban employment centers, in areas conducive to large-scale crop farming. Exceptions to this pattern are in areas such as the Central Valley of California, where large farms lie close to or within major metro areas.

The number of mid-sized commercial farms, those in between the extremes, continues to shrink. Most of these farms produce food and feed grains that are included in Federal commodity programs. Thus, mid-sized farms receive over half of all direct Government payments. Farm operators are usually employed full-time on the farm, but often someone else in the household works off-farm. One-quarter to one-third of the family income on these farms comes from off-farm sources. The average household income of this group is comparable to that of all U.S. households in most years.

The farm sector seems to be overcoming the financial difficulties of the mid-1980's. The proportion of farms that are financially vulnerable today is half that of 1985. Farmland prices have stabilized and are beginning to rise. Reduced farm operating costs contributed to farm income recovery. Favorable farm financial forecasts for 1989 indicate that the farm sector will enter the 1990's in a much improved financial position.

New Forces Affecting the Farm Economy

The factors that influence the economic health of the U.S. farm sector have greatly expanded over the last decade. Gone, perhaps forever, is that special situation following World War II, when the United States operated essentially in a closed economy and when our farming and manufacturing sectors set the standards for the world. A new generation of American farmers is learning the secrets of surviving in a dynamic and competitive world economy. Today's farmers must understand the technical aspects of crop and livestock production and Federal farm programs. They must also master the implications for their farm businesses of changing Federal monetary and fiscal policy, international exchange rates, environmental policy, tax policy, and emerging technologies. Today's successful farmers must indeed be keen business managers.

Federal Government's Role in Agriculture

For over half a century, the Federal Government has managed the supply of major agricultural commodities. Debate over these programs has historically focused on

the extent to which they should be market-oriented. Philosophies about the degree of market orientation clash in the process of establishing price support levels and other program rules. The issue of the Government's role in domestic agricultural markets has been confounded during the 1970's and 1980's by the major role that commercial exports play in U.S. commodity markets. When world economic conditions and relatively high world commodity prices favored the U.S. farming sector in the mid-1970's, the Federal Government raised domestic price support levels to mirror world prices with little cost. However, when the terms of trade for U.S. agriculture changed radically in the early 1980's, and the United States lost its world market share, high price support levels translated into substantial Federal budget exposure. Large Federal outlays for commodity programs could not be sustained, especially in the light of general Federal budget problems. The Food Security Act of 1985 represented a major change in direction; Federal price supports were systematically lowered and export assistance was added in hopes of regaining world market share and reducing future Government budget exposure.

Commodity Programs

During the 1980's, the Federal Government transferred between \$2 billion (calendar year 1980) and \$20 billion (calendar year 1986) annually from taxpayers to farmers who grow wheat, rice, feed grains, and cotton. Since 1982, transfers have averaged almost \$14 billion per year. This sum includes both direct payments to farmers and net Commodity Credit Corporation loans and represents 1-13 percent of total U.S. gross cash farm income. Only about one in three U.S. farmers actually participated in the commodity programs in 1988. Many U.S. farmers do not grow covered commodities and not all of those who grow such crops choose to participate in the Federal programs.

A characteristic of Federal farm commodity programs since the 1930's is that the amount of support is directly related to the quantity of a commodity that a farmer produces. Thus, the average payment per recipient increases as farm size increases, ranging in 1988 from \$1,400 for the smallest size group (less than \$10,000 in annual sales) to \$56,700 for the largest group (\$500,000 or more in annual sales). However, almost 50 percent of Government payments in 1988 went to producers having annual gross sales of \$40,000-\$250,000. Half of all recipients were in this size group and almost two-thirds of all producers in this size category participated. Participation is highest among cash grain and cotton producers and producers residing in the Northern Plains, Corn Belt, and Lake States. Government payments helped participating farm families stabilize their financial situation during the 1980's period of financial stress and debt restructuring.

Soil Conservation

High market prices or “artificially” high Federal commodity supports encourage producers to expand production on marginal cropland. Such practices increase soil erosion, at some risk to the environment and the future productivity of the Nation’s farmland. Legislators responded to soil erosion problems by including in the Food Security Act of 1985 several provisions designed to reduce agricultural soil erosion and protect wetlands.

Participation in commodity programs is contingent, in part, upon adopting sound conservation practices. Producers on highly erodible cropland needed to obtain an approved soil conservation plan for this land by January 1990 if they wished to continue participating in commodity programs. Farmers who convert wetlands to crop production after 1985 are denied farm program benefits. The “swampbuster” provision may effectively prevent about 6 million of the 17 million acres of wetlands otherwise suitable for conversion to cropland from being drained for crop production. However, the effectiveness of these provisions depends upon the continued attractiveness of Federal price and income support programs.

The 1985 law also established a conservation reserve program (CRP) through which farmers could voluntarily retire highly erodible cropland for 10 years in exchange for a rental payment from the Government. The Government also provides half the cost of establishing required long-term cover such as grass and trees. This program, by diverting production resources to conserving uses, will reduce outlays for commodity programs. By February 1989, farm owners had enrolled about 30 million of the potential 70 million acres of eligible cropland in the program. Most of the enrolled acres are in the Northern and Southern Plains and in the Mountain States. If half the eligible land is ultimately enrolled, annual Federal rental expenditures may reach \$2.5 billion from 1990 through 1995. After 1995, total expenditures will decline as land initially enrolled begins to leave the program.

Tax Policies

Federal tax policies influence the structure of agriculture by affecting the relative prices of inputs and the level of taxation on farm income. Preferential tax treatment for farmers that others do not receive constitutes indirect subsidies for the farm sector. The major distinction between tax subsidies and other forms of direct payments to farmers is that tax subsidies are “off budget.” Tax forgiveness does not appear on either the revenue or expenditure side of Federal budgets. Thus, Congress does not annually scrutinize tax subsidies.

Preferential tax policies encouraged both farmers and nonfarm investors to take advantage of special income tax rules applicable to farm investments. Thus, the farm sector attracted capital for tax shelter purposes rather than true economic reasons. Nonfarm investors used farm losses (for tax purposes) to reduce their tax liability on nonfarm income. For example, nearly 20 percent of the net investment in agricultural equipment over a 30-year period beginning in 1956 has been attributed to favorable tax policies for investment in depreciable capital. Before 1986, these and other tax provisions encouraged farm incorporation, the conversion of wetland and other land into cropland, and the expansion of agricultural production. These policies, in turn, put downward pressure on commodity prices. These expansionary tax policies came at the same time that Federal commodity programs were paying farmers to remove land from production to raise commodity prices.

The Tax Reform Act of 1986 shifted the Federal income tax system so that future decisions to invest in agriculture will be based more on economic returns and less on tax benefits. For some farm commodities, this change should mean reduced investment, lower production, increased product prices, and higher total revenue for producers.

Credit Programs

Credit has played an important role in farm structural change. Total U.S. farm debt has grown steadily since World War II as farmers made use of readily available, low-cost credit to acquire land, machinery, and production inputs such as fertilizer and farm chemicals. Farmers’ use of financial leverage (using relatively small equity to gain control over production assets) is directly related to farm size as larger farms report higher debt/asset ratios than small farms. Younger operators usually use credit extensively to acquire production assets.

Buoyed by optimistic assessment of future farm incomes, rapidly rising land values, and negative real interest rates, farmers expanded their debt levels three-fold during the 1970’s. Major agricultural lenders helped this expansion partly by stressing collateral rather than repayment ability when evaluating loan applications. All lender groups increased their loan volume to farmers during 1975–83, but growth rates for Farmers Home Administration (FmHA) and the Farm Credit System (FCS) exceeded those for other lenders.

Debt levels have declined substantially since the \$207 billion high point in 1983 as farmers reduced their borrowing and paid off loans, or lenders wrote off loans during the farm recession of the mid-1980’s. The farm financial reversal in the 1980’s also hurt agricultural lenders. Over half of the \$53 billion decline in farm

debt during 1983–88 took place in the Farm Credit System portfolio, threatening the solvency of the system. The Agricultural Credit Act of 1987 required a series of reorganization steps to streamline the FCS and reduce operating costs. The act also included the machinery to create a secondary market, through the Federal Agricultural Mortgage Corporation (“Farmer Mac”), for qualifying agricultural real estate and rural housing loans.

Near-term prospects for farm credit availability look good, especially for low-risk borrowers. Lenders now can satisfy a significant expansion in credit demand by farmers. Agricultural bank loan/deposit ratios are low, reflecting the capacity for increased lending to credit-worthy customers. FCS’ lending position is somewhat improved, and other lenders will probably remain active in the farm lending market. Most lenders are assuring the quality of loan portfolios, in part, by giving greater weight to applicants’ ability to repay.

The emergence of large commercial farms (still largely family owned) that are as efficiently managed as any large nonfarm business and the movement toward standardization of financial statements suggest the loss of the uniqueness of agriculture in its role as credit user. Restructuring farm credit institutions to achieve improved efficiency in the agricultural credit market means that farm lenders will compete nationally for funds. Thus, farmers will have to compete more with nonfarm business borrowers to obtain funds for expansion and operating needs.

Research Policy

Public agricultural research policy and funding also affect farm structure. Plant and animal research over the years has focused on developing new technologies to improve food production and quality. New technology adopted by farmers has combined with economic forces to change farm structure. Technology, specifically biotechnology, may potentially alter the structure of U.S. agriculture. Animal growth hormones are the closest to leaving the laboratory and heading for the farm. Bovine growth hormone could increase milk production up to 12 percent per cow. Porcine growth hormone could increase hog feed efficiency and growth rates by a similar amount. With growth hormone technology, more efficient producers will likely benefit more than less efficient producers. While growth hormone technology is itself size neutral, it will probably add to the other economic and policy forces shaping the increasing concentration in the dairy and hog sectors, thus further altering the structure of American agriculture.

Macroeconomic Environment

Domestic and foreign macroeconomic policies, economic environments largely beyond farmers’ control,

increasingly affect the profitability and health of farms. Throughout the 1980’s, the Federal Government has spent more than the revenue it has received, borrowing the difference from private sources through financial markets. The Federal Reserve has maintained a rather tight monetary policy, designed to keep inflation in check. This particular macroeconomic policy mix raises real interest rates and the exchange value of the dollar in world markets, thereby increasing imports and reducing exports and commodity prices, and increasing interest costs. These developments contributed to the farm recession of the mid-1980’s. Agricultural products, only 2 percent of the U.S. gross national product, accounted for 17 percent of the value of U.S. merchandise exports in this decade. Farming is more adversely affected by such policies than are other segments of the U. S. economy.

In late 1985, Governments of major developed nations signalled a willingness to help bring down the high value of the dollar by altering their domestic monetary and fiscal policies. At the same time, the passage of the Balanced Budget and Emergency Deficit Control Act of 1985 (also known as the Gramm-Rudman-Hollings act) showed the readiness of U.S. policymakers to attempt to bring down the Federal deficit. These policy initiatives have met with some success. The value of the dollar has fallen since 1985, and the Federal budget deficit has been reduced. But, since mid-1988, improvements in the Federal budget and trade deficits seem to have slowed. This situation suggests that macroeconomic policies over the next several years will continue to focus on the orderly unwinding of both problems. Prudent fiscal and monetary policy management over the next few years should provide a stable macroeconomic environment that would benefit agriculture and the rural economy. A substantial oil price increase or some other unforeseeable event, however, may damage such stability.

Trade Policy

The rapid drop in agricultural exports in the early 1980’s brought trade policy to center stage as a farm policy issue. Exports buoyed the farm economy during the 1970’s. But during the early 1980’s, U.S. farmers experienced the downside effects of shrinking export markets. When U.S. real interest rates rose to record high levels leading to a strengthening of the U.S. dollar in world markets, the volume of U.S. farm exports dropped substantially. The United States lost world market share, and farm policymakers became increasingly concerned about international trade policy. The border policies of industrial countries have served primarily to support the objectives of their domestic farm policies. No specific structural objectives are associated with U.S. agricultural trade policy other than to assure a competitive economic environment that promotes the

survival of well-managed, independent, owner-operated farms and ranches.

Agricultural protectionism, in which governments intervene in the market to promote domestic goals, has increased around the world. World commodity markets are increasingly distorted as more and more countries adopt import restrictions and export subsidies to facilitate their own domestic farm policies. These protectionist policies carry the risk of escalating conflict and uncertainty in world markets as participants attempt to transfer the costs of maintaining or adjusting domestic policies to others. For the United States, whose agriculture depends heavily on exports, the resulting instability lends itself to boom-or-bust cycles in which the economic well-being of less competitive farmers depends greatly on the willingness of taxpayers to support domestic farm programs.

International negotiations on import quotas and other border measures that countries use to control trade are not sufficient to disentangle inefficient world commodity markets that result from government intervention. Such negotiations must also consider domestic farm policies if they are to be effective. The current multilateral trade negotiations recognize for the first time that the relationship between domestic agricultural policies and agricultural trade policies is a legitimate subject for negotiation. Most U.S. policies and programs that provide support for domestic producers could change if negotiations succeed. U.S. farmers would face a more competitive trading environment if income increasingly depends on market forces rather than on Government programs. But, in a world where agricultural markets are less distorted by protectionist policies, U.S. farmers could also have more opportunities to compete.

Rural Economies

Public policies that influence the U.S. farm sector also indirectly affect the economy of U.S. counties where farming most dominates the local economy. Farming generates at least 20 percent of total earnings in 514 of

the more than 3,000 counties in the contiguous United States. Located predominantly in the Plains and western Corn Belt, their economies were affected the most by the 1980's farm financial recession. These counties are vulnerable because they produce commodities, such as wheat and corn, most susceptible to fluctuations in international trade and because they lack the industrial diversity that can stabilize economies after adverse fluctuations in a primary industry. Such farming-dependent counties are typically sparsely populated and have experienced low population growth or even actual population decline. Population peaked at the turn of this century and has been declining since in some of these counties. Despite population decline, per capita income levels in farming-dependent counties have been high compared with many counties less dependent on farming. Because of the specialization of farming-dependent counties in Federal program commodities, their farmers rely more on Government support than farmers in other areas. Further farm consolidation into the 1990's will make population retention difficult in many of these counties unless nonfarm jobs can be expanded to help offset job losses from farming. Some farming-dependent communities will have difficulty maintaining the public and private services necessary to retain a community identity. This portends further community consolidation, particularly in the vast Plains region.

Elsewhere, in most rural communities, farming is no longer the cornerstone of the local economy. Farming is still present, but its economic influence has been eclipsed by manufacturing or another economic activity. While one might argue that some farm input and processing industries in local communities depend on the well-being of the farm sector, this argument is tempered by the fact that much farm input and processing employment is based in metro areas. Thus, those who argue that keeping the farm sector strong will preserve rural America must realize that this argument applies to only a few rural places, and a very small part of the rural population. Farm policy is not synonymous with rural policy.

The Structure and Status of the Farm Sector

Donn Reimund and Nora Brooks*

The farm sector, entering the 1990's, leaves a tumultuous decade. The main features of the 1980's were the farm recession and the farm financial restructuring that followed. Although the financial condition of many farmers was precarious throughout much of the 1980's, the sector appears to be recovering. Despite the farm recession, farm structural characteristics and trends continued on the same basic course that has been underway for the past three or more decades toward fewer, larger, and more capital-intensive farms.

The Structure of the Farm Sector

The diversity among farms is significant (for all the dimensions that define the structure of the agricultural sector), including size, sources of income, ownership, major commodities produced, and location. To better understand this diversity, we divided all farms into six size classes according to value of annual farm product sales. The first two sales classes are called noncommercial farms, because they produce relatively small amounts of farm products and provide insufficient farm income to support a family at today's living standards. The remaining classes which have sufficient sales to be considered healthy, income-producing businesses are commercial farms. The classes are as follows:

Noncommercial—

(1) Farms with less than \$10,000 of annual farm product sales.

(2) Farms with \$10,000–\$39,999 sales.

Small commercial—

(3) Farms with \$40,000–\$99,999 sales.

Medium commercial—

(4) Farms with \$100,000–\$249,999 sales.

Large commercial—

(5) Farms with \$250,000–\$499,999 sales.

(6) Farms with more than \$500,000 sales.

In 1987, noncommercial farms accounted for over 70 percent of all U.S. farms, but only 9 percent of the value of farm product sales (table 1). In fact, over half of all farms had less than \$10,000 in sales and less than 3 percent of the value of products sold. In contrast, large commercial farms, with over \$250,000 in sales, accounted for less than 5 percent of all farms but 55 percent of the value of sales. Of these, the largest size class accounted for 38 percent of the sales and only 1 percent of farms (fig. 1).

Net cash farm income per farm was highest in the largest sales class, averaging almost \$800,000, and fell rapidly as sales declined. The smallest size class had a loss of almost \$1,000 per farm. Off-farm income per farm also had the highest average for the largest farms; however, off-farm income was a larger share of total cash income for smaller farms. For farms with less than \$10,000 in sales, off-farm income was 104 percent of total income, because of negative net cash farm income. Much of the off-farm income of farms with less than \$100,000 in sales comes from wage and salary employment. Farms with more than \$100,000 in sales are more likely to derive their off-farm income from investments and other nonemployment sources. This description is particularly evident from the distribution of farms by days of off-farm work. Most of the smallest noncommercial farm operators reported more than 200 days of off-farm work. For the commercial classes, 65–80 percent reported no off-farm work. The average income of all U.S. households in 1987 was about \$32,000. The average total cash income of all commercial farm households exceeded the U.S. average in 1987.

The actual number of incorporated farms increased by 178 percent during 1969–82 with most of the increase occurring during 1969–78. (Data for 1987 were not available at the time this report was prepared.) However, farming continues to be a predominantly family-owned business, regardless of the size of the operation. Almost all farms are family owned (table 1). The overwhelming majority are sole proprietorships. A significant percentage of the larger commercial farms are partnerships or family-held corporations. In even the

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Table 1—Profiles of farms by sales class, 1987

Characteristic	Sales class						
	Less than \$10,000	\$10,000– \$39,999	\$40,000– \$99,999	\$100,000– \$249,999	\$250,000– \$499,999	\$500,000 or more	All farms
<i>Thousand</i>							
Number and size: ¹							
Number of farms	1,139	450	286	201	71	29	2,176
<i>Percent</i>							
Share of all farms	52.4	20.7	13.2	9.2	3.2	1.3	100
Share of total product sales	2.8	6.6	13.1	22.0	17.9	37.5	100
<i>Acres</i>							
Acres per farm	12.3	394	828	1,278	2,304 ²	²	461
<i>Dollars</i>							
Income per farm: ¹							
Net cash farm income	– 964	6,951	27,328	67,244	154,313	792,964	26,222
Off-farm income	24,040	22,951	14,621	14,383	16,090	29,363	21,493
Total cash income	23,076	29,902	41,949	81,627	170,403	822,326	47,714
<i>Percentage of farms in sales class</i>							
Farms by SIC group: ³							
Livestock	62.0	44.0	46.0	51.0	52.0	55.0	54.0
Program crops	22.0	44.0	44.0	39.0	33.0	19.0	32.0
Other crops	16.0	12.0	10.0	10.0	15.0	26.0	14.0
Organization: ³							
Sole proprietorship	92.8	87.3	84.7	76.7	60.5	40.1	87.3
Partnership	6.5	11.2	12.5	16.6	21.7	22.5	10.0
Corporation, family held	.6	1.3	2.5	6.2	16.2	31.0	2.4
Corporation, other than family held	.1	.2	.3	.5	1.5	6.1	.3
Tenure of operator: ³							
Full owner	77.0	53.0	36.0	30.0	30.0	36.0	59.0
Part owner	15.0	31.0	48.0	58.0	60.0	53.0	29.0
Tenant	8.0	16.0	17.0	12.0	10.0	11.0	12.0
<i>Percentage of farm operators reporting</i>							
Off-farm employment: ³							
None	26	43	65	74	78	80	42
1–99 days	8	13	16	14	11	8	11
100–199 days	11	11	6	4	3	3	9
200 days or more	55	33	13	8	8	9	38
<i>Percentage of commodity sales</i>							
Commodities: ³							
Livestock	3	7	15	23	14	38	100
Program crops	2	12	22	32	18	14	100
Other crops	1	6	9	15	14	54	100
<i>Percentage of farms in region</i>							
Regional distribution: ³							
Northeast	50	18	17	11	3	1	100
North Central	34	27	22	13	3	1	100
South	63	20	8	6	2	1	100
West	52	20	12	9	4	3	100

¹ From *Economic Indicators of the Farm Sector: National Financial Summary, 1987*, ECIFS 7–1, U.S. Dept. Agr., Econ. Res. Serv., Oct. 1988.

² Data are for farms with sales of \$250,000 or more.

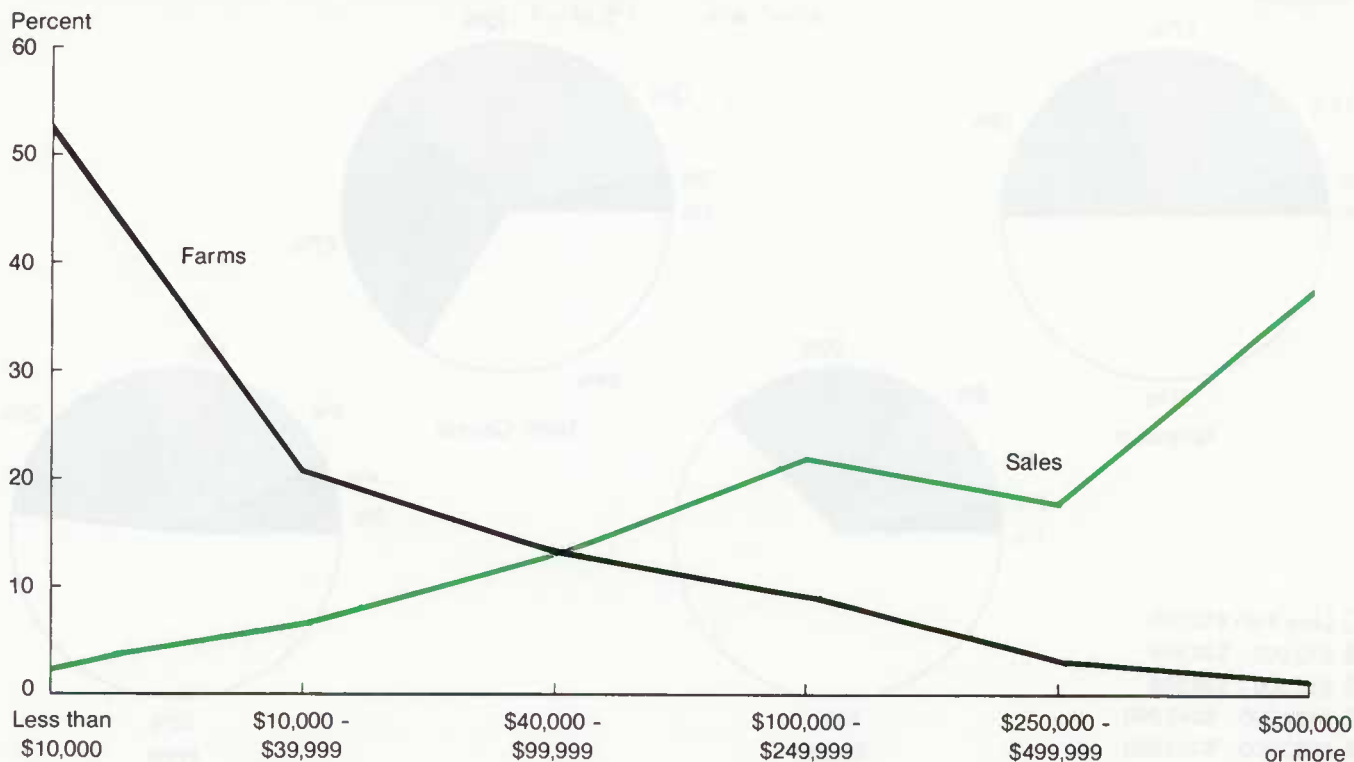
³ From 1982 Census of Agriculture.

largest commercial farm class of over \$500,000 in gross sales, only 6 percent of the farms are nonfamily corporations.

Nearly three-fourths of all livestock sales come from farms with sales of more than \$100,000 per year. Yet livestock is the predominant farm type for all sales classes, except the larger noncommercial farms which

have equal proportions in livestock and program crops. By sales class, the highest proportion of livestock farms is in the less than \$10,000 class (62 percent) and the lowest (45 percent) is in the other noncommercial class. These farms typically have only a few cattle. More than half the farms in the three largest classes are livestock farms. These tend to be feedlots and large poultry and hog operations.

Figure 1
Distribution of farms and sales by sales class, 1987



Sales of crops included in Federal price and income support programs are more concentrated among the small and medium commercial classes (54 percent) and the \$250,000–\$499,999 class (18 percent). Farms specializing in program crops account for 33–44 percent of farms in all but the smallest and largest sales classes. Sales of nonprogram crops are heavily concentrated on the largest farms (54 percent) that tend to be large fruit and vegetable operations. The largest concentrations of farms producing nonprogram crops by sales class fall in the largest and smallest classes, with the small farms primarily producing hay.

The South has the highest proportion of farms with sales less than \$10,000 (fig. 2). For the small and medium commercial farms, the largest concentrations are in the North Central region. The largest concentrations of the large commercial farms are in the West.

Farm Structural Changes in the 1980's

The latest Census data (1987 Census of Agriculture Advance Reports¹) show that the long-term structural trends of declining farm numbers and land in farms and increasing farm size continued through the 1980's

(table 2). At 2.1 million, the 1987 farm count was down 6.8 percent from 1982. The 1987 Census reported the total land in farms at 964.5 million acres, a 2-percent drop since 1982. The average farm size increased from 440 acres in 1982 to 462 acres in 1987.

All regions of the country, except the Mountain States, had fewer farms in 1987 than in 1982. The largest regional declines were in the South Atlantic region (12.5-percent decline), the East South Central region (11.8-percent decline), and the East North Central region (9.6-percent decline). Together, these three regions lost 106,237 farms between 1982 and 1987, nearly 70 percent of the total U.S. farm loss.

The 1982–87 decline in the number of farms was heavily concentrated in the small commercial size range (annual product sales of \$25,000 to \$99,999 as reported in the 1987 Census of Agriculture).² The number of

¹ Data from the 1987 Census of Agriculture Advance Reports are summarized in the appendix.

² In the 1987 Census of Agriculture, some farm sales boundaries were changed from those reported in time series data developed by USDA's Economic Research Service (ERS) and National Agricultural Statistics Service (NASS). The \$10,000–\$19,999 sales class was changed to \$10,000–\$24,999, the \$20,000–\$39,999 class was changed to \$25,000–\$49,999, and the \$40,000–\$99,999 class was changed to \$50,000–\$99,999. Other sales classes reported in the 1987 Census remained the same as those used in the NASS and ERS data series. *Economic Indicators of the Farm Sector: National Financial Summary, 1987* (ECIFS 7-1) estimates that farms in the less than \$20,000 sales classes accounted for 5.2 percent of cash receipts from farm product sales in 1987 and –0.3 percent of net cash income from farming.

Figure 2
Sales class distribution of farms, by region

Thousands

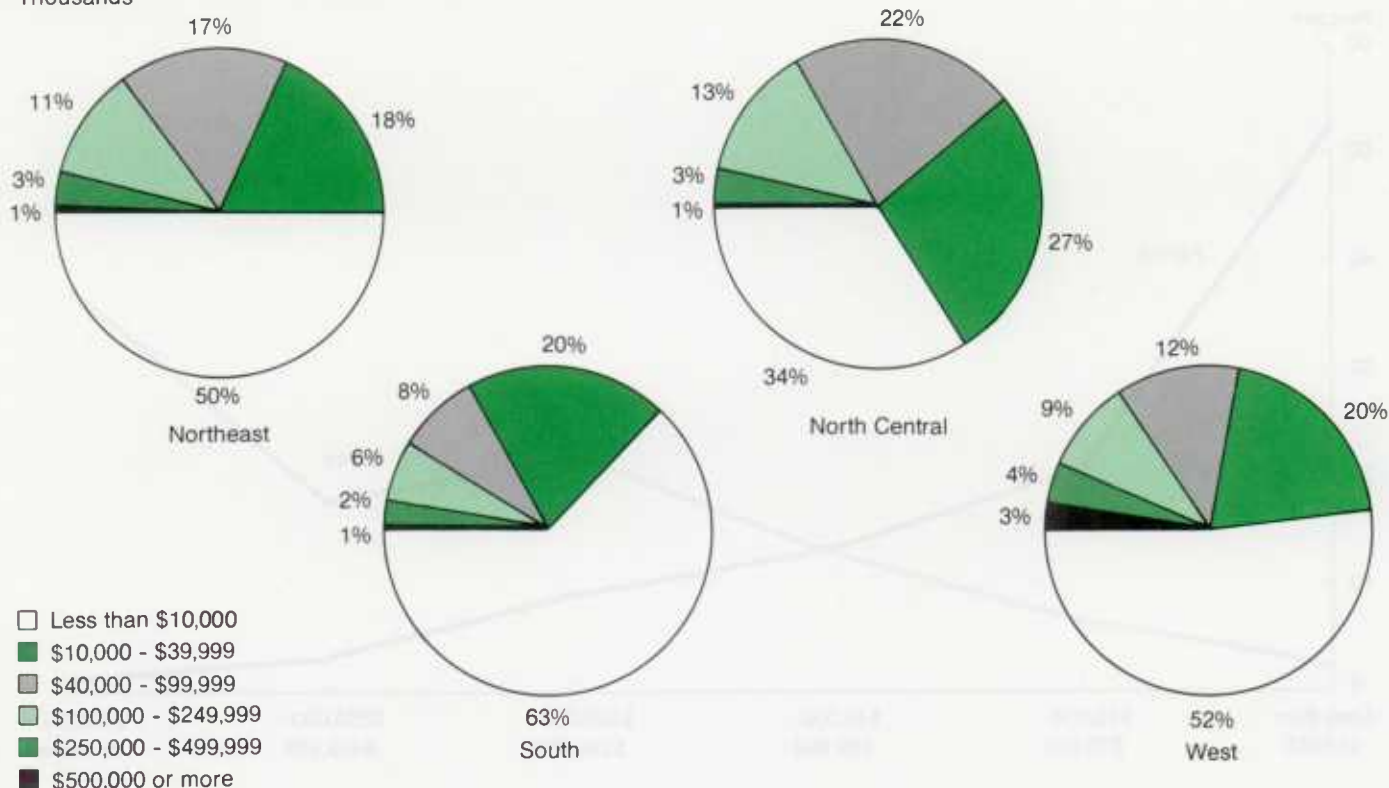


Table 2—Distribution of farms by sales class

Sales class	1982	1987
<i>Number</i>		
Less than \$10,000	1,096,337	1,028,186
\$10,000–\$49,999	589,082	545,802
\$50,000–\$99,999	251,501	218,050
\$100,000 or more	302,380	295,721
Total	2,240,976	2,087,759

Source: 1987 Census of Agriculture Advance Report.

farms in this size range fell by 12.5 percent and accounted for over 40 percent of the total decline over the period. The drop in the number of small commercial farms continues previous trends. Farms in this size range are generally too small to provide an adequate level of family living when operated as full-time farm units and too large to operate as part-time units in conjunction with off-farm operator employment. Thus, farm operators in this size range have a strong incentive to either expand their farms to a stronger, larger size or to contract to a size that can more readily be operated on a part-time basis in conjunction with off-farm work.

About half of the 1982–87 absolute drop in farm numbers was accounted for by small noncommercial farms (annual product sales of less than \$25,000). However, the rate of decline of these farms was less than half that

of the small commercial farms. Noncommercial farms increased between 1982 and 1987 from 64 to 65 percent of all farms, while small commercial farms decreased from 22 to 21 percent of all farms. Larger commercial farms with \$100,000 or more in annual product sales remained at about 14 percent of all farms in both Census years.

Number of acres is another commonly used measure of farm size. Like the sales class distribution, the distribution of farms by acreage is skewed toward the lower end of the size spectrum; that is, there are more small farms. Nearly 60 percent of all U.S. farms had less than 50 acres in 1987, according to the 1987 Census of Agriculture Advance Report. Fewer than 20 percent of all farms had 500 or more acres. The number of farms with 50–500 acres dropped by more than 115,000 between 1982 and 1987, accounting for 75 percent of the total drop in the number of farms. The number of farms of 10–50 acres also dropped significantly, accounting for nearly 25 percent of the 1982–87 farm number drop. The number of farms with less than 10 acres and with 500–999 acres declined slightly, while the number of farms with 1,000 or more acres increased slightly.

The changes in the acreage and sales class distributions in the 1980's together illustrate an emerging dual structure in U.S. agriculture. Both size measures show that

the decline in farm numbers was concentrated in the middle of the farm size distribution, with much lower rates of decline among small and large farms. Both small noncommercial farms and large commercial farms are increasing as a proportion of all farms.

Several factors explain this change in farm size distribution. Foremost, technological advances over the past few decades have greatly enhanced labor productivity. Technology has encouraged farm expansion because larger operations are necessary to provide full-time employment for farm operators. A second major reason is farmers' desire to achieve income levels and standards of living equivalent to those of persons employed in the nonfarm sectors of the economy. This desire has led to both growth at the high end of the size spectrum and reduction in farm size at the low end. Farm operators who want to farm full-time may have to expand to achieve their desired income level. Others may find it more advantageous to contract their farming operation to a size compatible with full-time off-farm employment. The net result of these structural forces is a continuing decline in small, commercial-size farms as a proportion of all farms.

Farm Financial Conditions in the 1980's

The 1980's was a turbulent decade for the U.S. farm sector. Following the agricultural boom of the 1970's, fueled largely by export expansion, the early to mid-1980's saw declining farm exports, dramatic declines in farm asset values, particularly land values, and falling farm incomes. Land values in 1988 had fallen to only one-half those in 1982 in the Corn Belt and Lake States (fig. 3). Land values in the Northern Plains and Delta States averaged over 40-percent lower in 1988 compared with 1982. Average farm household incomes remained below the average income of all U.S. households from 1979 to 1985 (fig. 4). Many farmers, particularly those who had started farming or pursued a strategy of debt-financed expansion during the 1970's, found themselves in severe financial stress through much of the 1980's because of declining assets and income.

Signs of recovery from the farm recession began to appear by late 1986 and continued in 1987 and 1988. Farm asset values stabilized by the end of 1987. However, the 1987 value of farm assets, \$691 billion, was just over half the peak 1980 value of \$1,286 billion (in

Figure 3

Land values dropped significantly during 1982-87, but have improved since

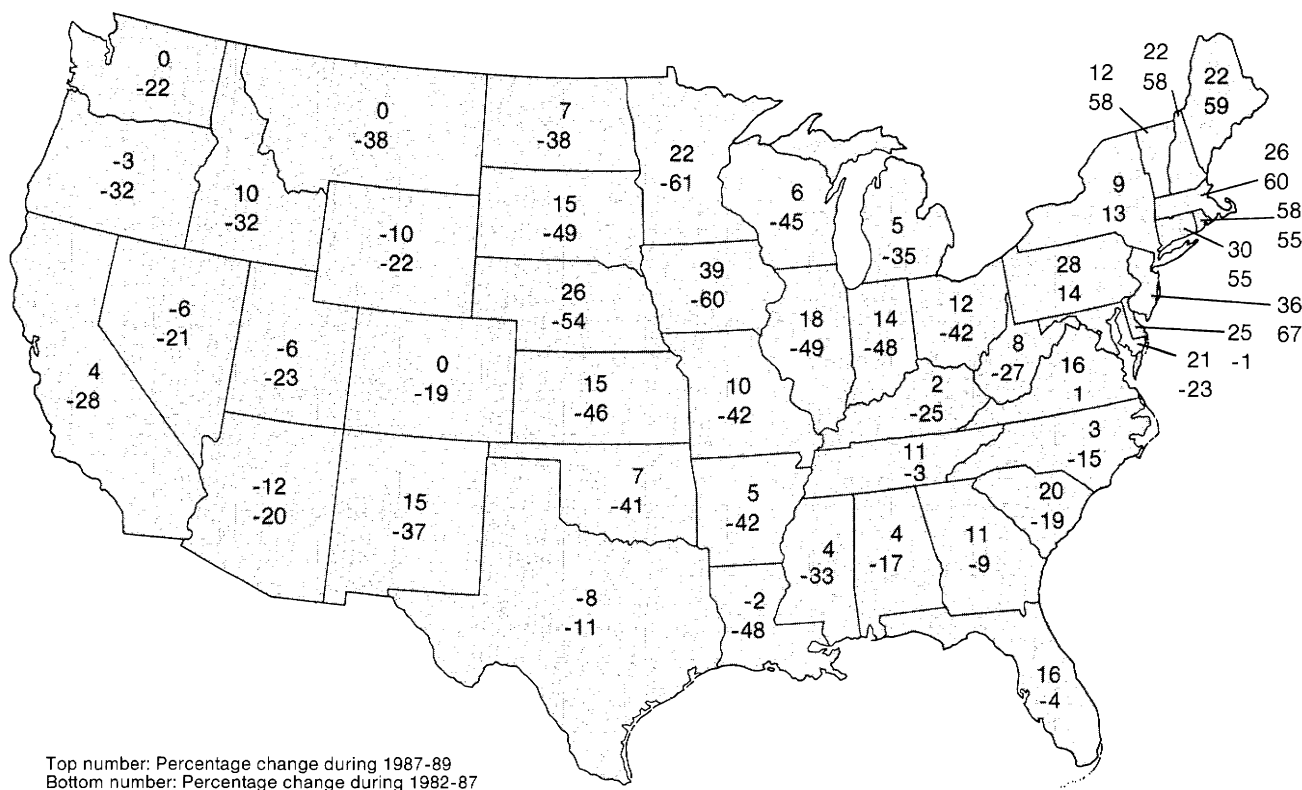
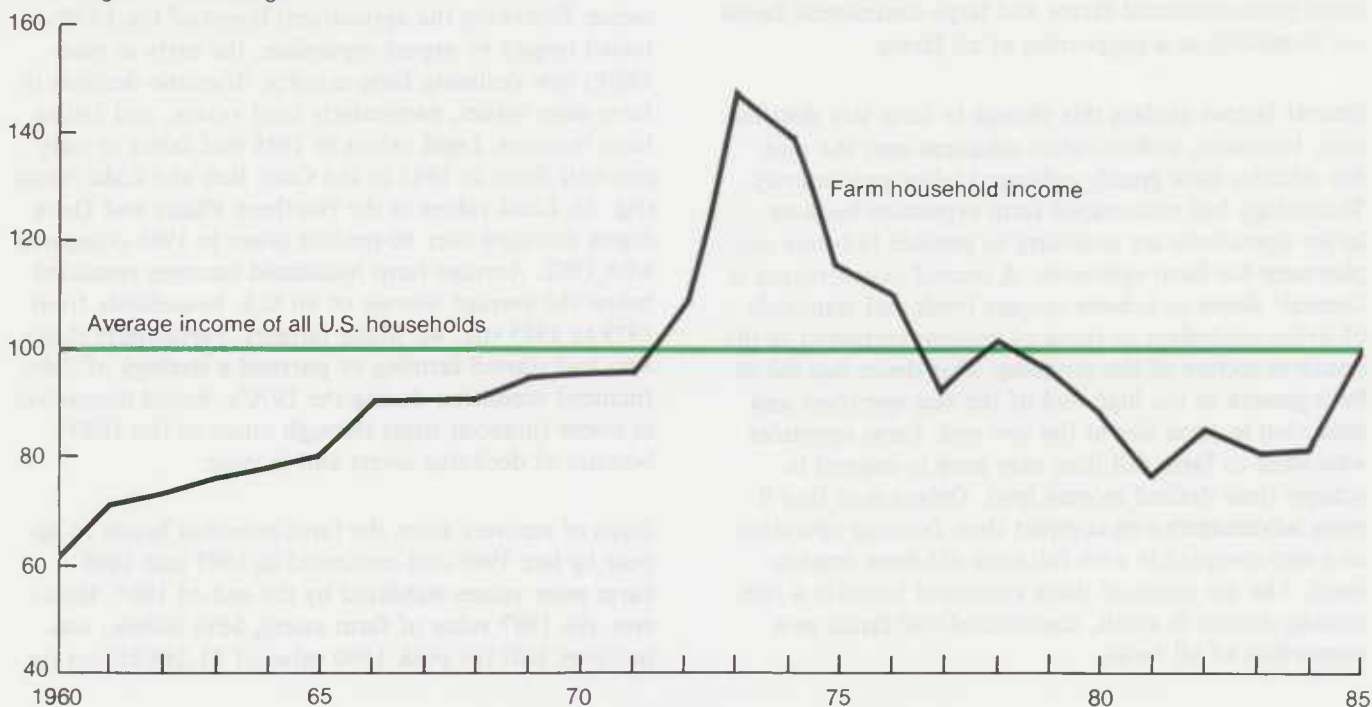


Figure 4

Farm operator household income compared with U.S. average

Percentage of U.S. average

**Table 3—Farm operator households by financial category¹**

Year	Financial category			
	Favorable ²	Marginal income ³	Marginal solvency ⁴	Vulnerable ⁵
	Percent			
1984	41.4	39.6	6.9	12.1
1985	45.4	33.3	10.1	11.2
1986	47.4	31.0	11.1	10.5
1987	51.7	33.4	8.1	6.8
1988	49.1	37.3	6.6	7.0

¹ Based on net cash household income which considers all sources of income and expenses accruing to the farm operator household. Data are as of January 1 of year shown.

² Favorable: Positive income and a debt/asset ratio less than 40 percent.

³ Marginal income: Low debt but negative income.

⁴ Marginal solvency: High debt (debt/asset ratio greater than 40 percent) and positive income.

⁵ Vulnerable: High debt and negative income.

Source: M. Morehart, J. Johnson, and D. Banker, *Financial Characteristics of U.S. Farms, January 1, 1989*, AIB-569, U.S. Dept. Agr., Econ. Res. Serv., July 1989.

1982 constant dollars). Real net cash farm income at \$48.5 billion in 1987 had recovered to its mid-1970's level. The improved financial conditions are reflected in an increase in the percentage of farm operator households in the strongest financial condition from 1985 to

1988 and a reduction in the percentage of those financially vulnerable (table 3).

Continued improvement in farm asset values and stable net cash farm income in 1988, coupled with forecasts of improved farm financial conditions for 1989, indicate that the farm sector will enter the 1990's in a much stronger financial position than in the mid-1980's.

Debt reduction by farmers, a massive infusion of Federal support to maintain farm income levels, and, more recently, a recovery of export markets have all contributed to the strengthening financial condition of the farm sector. Another contributing factor may be that many of the farmers who were in the most precarious financial condition during the earlier stages of the farm recession have left farming.

Farm debt (including households) escalated rapidly through the last half of the 1970's and into the early 1980's, peaking at \$206.5 billion in 1983 (fig. 5). From 1975 through 1981, increased farm debt was supported by rising farm asset values, so that the sector's debt/asset ratio remained relatively stable at about 16 percent. After 1981, farm asset values, led by real estate, began to decline, partly because of the increased value of the U.S. dollar in international money markets and macroeconomic policies designed to control inflation. By 1986, the value of total farm assets had dropped by

nearly 30 percent from the 1981 peak, while the aggregate value of farm real estate in 1986 was 35 percent below the 1981 level. Farm liabilities exceeded the 1981 level through 1984. The sector's aggregate debt/asset ratio increased, peaking at 22.2 percent in 1985. Total farm operator equity steadily declined from 1980 through 1986. Operator equity per farm fell from \$380,000 in 1980 to \$281,000 in 1986, a drop of 26 percent.

During the latter half of the 1980's, farm asset values began to stabilize while farm debt fell significantly. These improvements resulted from more favorable domestic and international economic conditions and from a major restructuring of farm debt in which loans were either paid off, refinanced, or written off. By the end of 1988, the sector's debt/asset ratio had fallen to 17 percent. This ratio was a significant improvement from 1985, but still well above the 1970's levels. However, the stabilization and subsequent turnaround of farm asset values and reduced debt burden have increased operator equity and strengthened the sector's financial outlook.

Federal income support to farmers (direct Government payments plus Commodity Credit Corporation net loans) peaked at \$20 billion in 1986 and provided critical aid to the farm sector in weathering the mid-1980's farm financial problems. The value of direct Government payments alone to farmers was \$16.7 billion in 1987, more than four times higher than the average of

the late 1970's and early 1980's. Federal payments to farmers accounted for 10-13 percent of gross cash farm income for 1985-87, compared with a historical average of about 5-6 percent.

Expanding export markets were a leading factor behind the agricultural expansion of the 1970's. The value of farm product exports increased from \$8.1 billion in 1972 to \$43.8 billion in 1981. The value of agricultural exports fell by 40 percent from 1981 through 1986, reaching a low of \$26.3 billion as economic conditions that fueled the earlier export growth reversed course. More favorable exchange rates, improved international economic conditions, and the export enhancement program (EEP) increased farm product exports in 1987 and again in 1988, both in value and volume. The volume of U.S. agricultural exports may have fallen slightly in 1989, largely because of drought-reduced 1988 production of major export commodities, but higher prices should boost export value by about \$2.7 billion above 1988. Favorable exchange rates and relatively strong world economic growth will continue to strengthen U.S. agricultural exports.

Farming-Dependent Areas

Farming-dependent counties were severely affected by the 1980's farm financial recession, because they tend

Figure 5
Farm sector assets, debt, equity, and debt/asset ratio¹

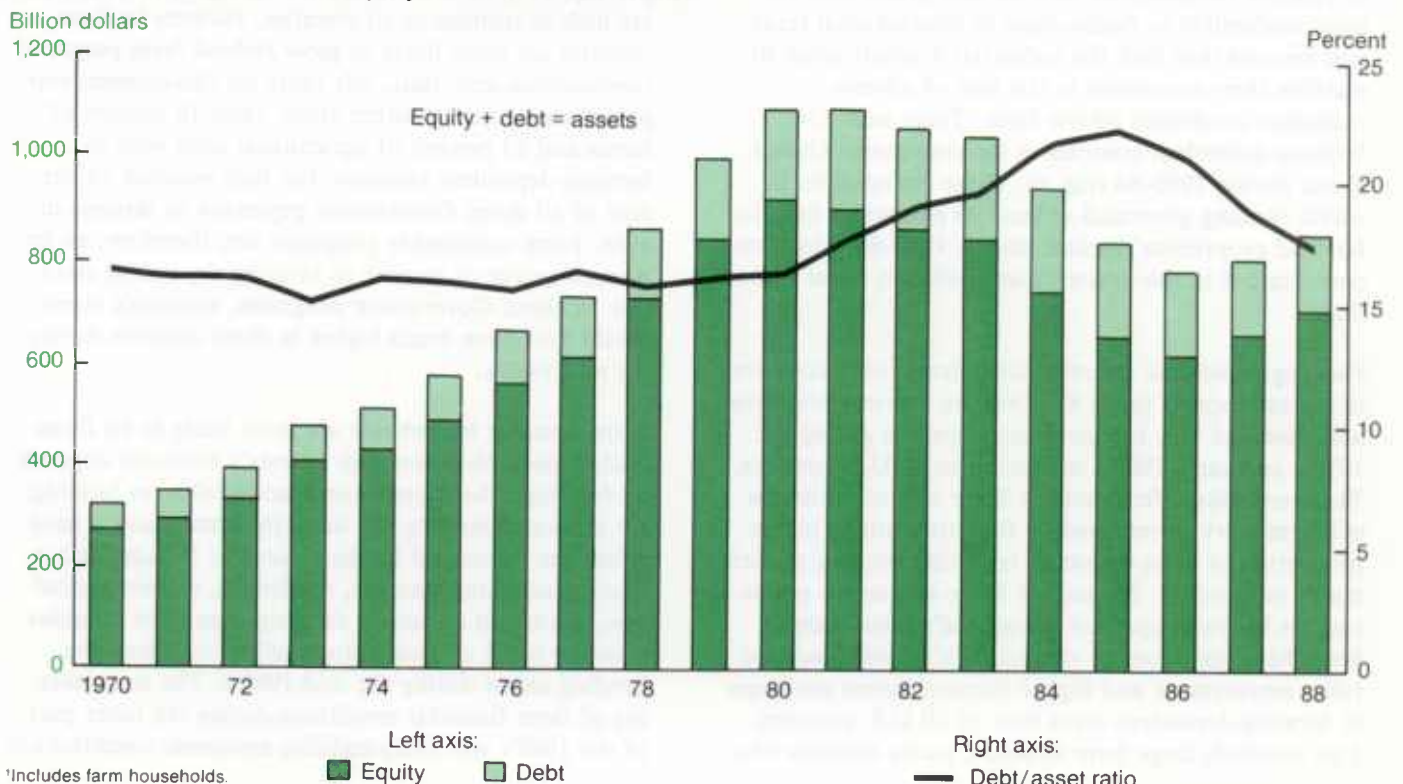
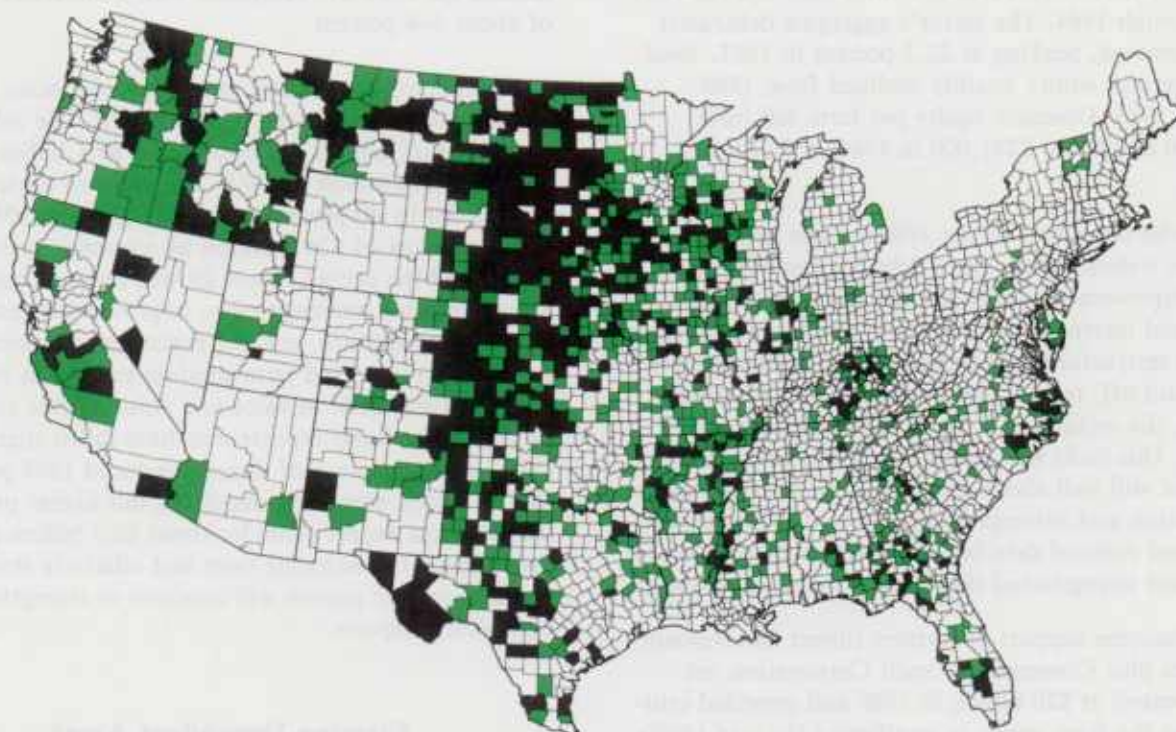


Figure 6

Farming-dependent counties, 1980-84 (614 counties)



- Farming-dependent counties: Farming generated at least 20 percent of the county's total earnings
- Farming-important counties: Farming generated 10-19 percent of the county's total earnings
- Not-farming-dependent counties: Farming generated up to 10 percent of the county's total earnings

to produce commodities such as cash grains that are most susceptible to fluctuations in international trade and because they lack the industrial diversification to stabilize their economies in the face of adverse economic conditions on the farm. There were 514 farming-dependent counties in the contiguous United States during 1980-84 (fig. 6). These are counties in which farming generated at least 20 percent of total labor and proprietors' income during 1980-84. Most are concentrated in the western Corn Belt and Great Plains States.

Farming-dependent counties differ from other counties in several respects (table 4). They are sparsely populated and have had very low population growth during the 1970's and early 1980's in relation to all U.S. counties. These counties offer relatively fewer opportunities for off-farm work as reflected by the substantially higher proportion of farm operators reporting farming as their major occupation. Because of fewer alternative opportunities for farm operator household's labor, households have incentives to expand their farms to achieve fuller employment and higher income. Farms are larger in farming-dependent areas than in all U.S. counties. This relatively large farm structure partly explains why

per capita income levels in farming-dependent counties are high in relation to all counties. Farmers in these counties are more likely to grow Federal farm program commodities and, thus, rely more on Government support than farmers in other areas. Only 16 percent of farms and 23 percent of agricultural sales were in farming-dependent counties, but they received 33 percent of all direct Government payments to farmers in 1986. Farm commodity programs are, therefore, an important source of income to farming-dependent counties. Without Government programs, economic stress would have been much higher in these counties during the mid-1980's.

Farm operator households are more likely to be financially vulnerable when their county's economy depends on farming. The more a community relies on farming for economic activity, the more the community's land values are influenced by the returns to farming rather than by nonfarm business, residential, or recreational uses. Farmland owners in farming-dependent counties bore the brunt of asset value declines that hurt the farming sector during the mid-1980's. The strengthening of farm financial conditions during the latter part of the 1980's will likely stabilize economic conditions in

Table 4—Selected characteristics of farming-dependent counties and all counties ¹

Item	Farming-dependent counties	All counties
<i>Number</i>		
Number of counties, 1980–84	514	3,069
Average population, 1985	9,957	77,290
<i>Dollars</i>		
Average per capita income, 1984	11,182	10,680
Net cash income per farm, 1986	28,955	16,115
<i>Percent</i>		
Percentage of farms	16	100
Percentage of farm sales	23	100
Sales class of farm, 1986:		
Less than \$40,000	43	65
\$40,000–\$99,999	27	17
\$100,000–\$249,999	22	13
\$250,000 and more	8	5
Farming as percentage of operator's major occupation	76	60
Percentage of direct Government payments, 1986	33	100

¹ Excludes Alaska and Hawaii.

Source: M. Ahearn, S. Bentley, and T. Carlin, *Farm-Dependent Counties and the Financial Well-Being of Farm Operator Households*, AIB-544, U.S. Dept. Agr., Econ. Res. Serv., Aug. 1988.

farming-dependent counties. However, because the total number of farms will continue to decline into the 1990's, many farming-dependent counties face poor prospects for population growth unless they diversify their economic base with nonfarm activity.

For additional reading . . .

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Federal Commodity Programs

Thomas A. Carlin*

Ever since farm program legislation was developed in the 1930's, the Federal Government has sought to improve the economic well-being of farmers. The present framework of programs emerged during a severe depression throughout a farm sector that was substantially less heterogeneous than today. One in four persons lived on farms. Thus, Government efforts to improve the income of the farm population would help reduce the national poverty problem. The theory behind almost all commodity programs developed over the last 50 years has been to raise farm commodity prices, thereby increasing total revenue to farmers, resulting in higher farm incomes. The complex set of commodity programs that has evolved transfers income from consumers and taxpayers to farmers. These transfers take the form of higher prices for food, direct Government payments to farmers, and Government purchase, storage, and disposition of commodities. Public sector intervention into farm commodity markets on behalf of farmers is not unique to the United States. All major industrial countries have farm price support systems.

With few exceptions, the farming sector throughout the last five decades has faced a chronic problem of excess production capacity with Government-supported prices. A small rise/fall in the supply of most farm commodities in the domestic market translates into relatively large declines/increases in market prices. When the Government supports commodity prices above the levels that would otherwise prevail in the marketplace, producers are encouraged to grow more of the commodity than can be sold at the higher price. Because farmers have relatively little market power, the primary task of removing excess production falls to the public sector. The Government has had to purchase and dispose of excess farm production. As Government costs to purchase, store, and dispose of the surplus increased, policymakers began to search for ways to lower Government budget exposure while achieving the farm policy goal of income support.

The Federal Government has used a variety of approaches over the years to manage surplus production. Early programs used mandatory acreage controls or marketing quotas where farmers, to be eligible for Federal price support, could grow only a certain acreage or amount of a crop. Later, direct payments were used to enable market prices to fall to world price levels and mandatory controls were replaced with voluntary acreage reduction programs. More recently, payment-in-kind (PIK) and generic commodity certificates have been used to compensate farmers for reducing production while reducing Government costs.

Marketing orders are generally used for perishable commodities such as fruit, vegetables, and dairy products. Some marketing orders manage the production of a commodity and direct some for export, storage, or processing to maintain prices and revenue. Others use classified pricing where producers receive higher prices for supplies that go to premium uses and lower prices for the balance of the output. In the dairy sector, for example, producers receive a higher price for milk for fluid uses than for milk for cheese or other uses. Import restrictions are also used for commodities such as dairy and sugar to limit supply and raise domestic prices while preventing import substitution by consumers.

Import quotas, production quotas, or acreage allotments have been established to control the supply of sugarcane, sugar beets, peanuts, and tobacco. Federal marketing orders have been developed to indirectly raise grower prices and incomes by controlling product quality, the quantity marketed, or selling conditions. These industry self-regulation programs apply to producers of certain fruits, vegetables, tree nuts, and specialty crops.

A system of price supports and supply management programs has been developed for major field crops such as wheat, feed grains, and cotton. These programs are the primary focus of this section.

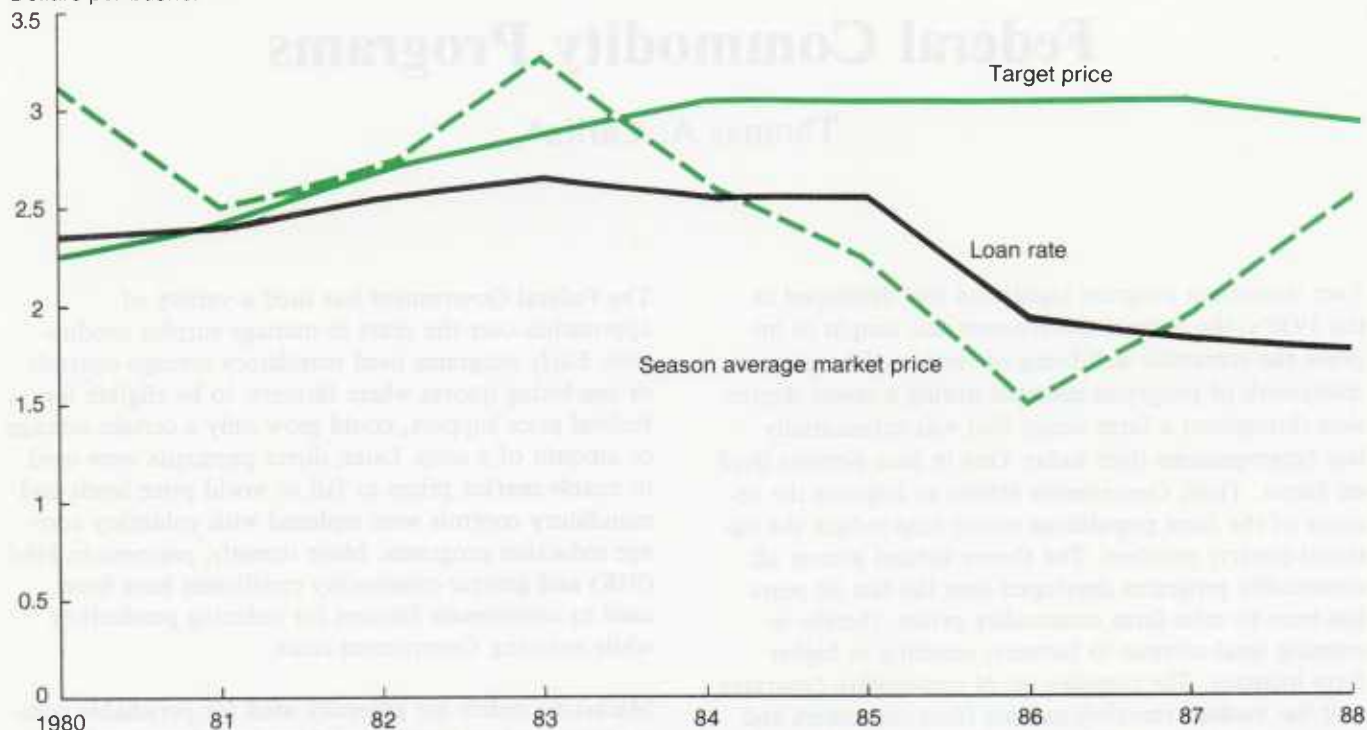
Since 1977, the price support/supply management system for major grains and cotton has focused on the relationship of three factors: target prices, loan rates, and market prices (fig. 7). The market price refers to

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Figure 7

Market prices for corn have been below target prices

Dollars per bushel



the price that a commodity is trading for in open commodity markets. Target prices are established by law and executive order and represent a commodity price that would achieve specified income goals. The loan rates are established by law and regulation and represent a price floor for a commodity. The target price is typically higher than the loan rate and, in recent years, has been higher than the market price. If the market price falls below the loan rate, the Federal Government acquires the crop produced by participants through a mechanism referred to as a nonrecourse loan. The Federal Government gives the farmer a loan based on the value of the crop offered as collateral. The value of the crop is determined by the loan rate. If the producer chooses not to redeem the loan, the Government keeps the crop without recourse to the farmer. A quasi-independent Federal agency, the Commodity Credit Corporation (CCC), manages the nonrecourse loan program.

When market prices are below the target price, the Federal Government will give participating farmers a direct payment, called a deficiency payment, for the difference between the target price and the loan rate or market price, whichever is higher. Total Federal Government costs, aside from administration, include the direct payment plus net purchases of commodities by the CCC.

Farmers who participate in these programs are often required to idle farmland to help reduce surplus grain stocks during periods when the market price is below the target price. One inherent characteristic of these programs since the 1930's is that the amount of support or benefit any one producer receives is directly related to the quantity produced by the farmer. This characteristic is cited often in public debates over targeting farm programs to argue that farm commodity programs encourage the trend toward fewer and larger farms.

Other debates over the structure of the farm commodity programs over the last five decades have usually focused on the extent to which the programs should be market-oriented. When market prices exceed target prices, these debates are pointless because the entire system is market-oriented. The effective prices received by farmers are determined by the market. During these periods, policy officials often view raising target prices as costless to the Federal taxpayer, but such actions can lead to budget problems when market prices fall. When market prices are below target prices, and especially when market prices are below loan rates, commodity prices are determined entirely by Government policy and Federal spending increases. Decisions about how the programs are managed are ultimately related to the taxpayer's willingness to provide transfers to the farm sector.

Lower Commodity Support Prices Spur Exports, Reduce Federal Costs

High CCC loan rates under the 1981 farm legislation, coupled with the rising value of the U.S. dollar, contributed to a decline in U.S. farm export volume after 1982 and a buildup of crop inventories. The United States had essentially priced itself out of world markets.

Growing commodity inventories were of particular concern to Government officials and to farmers specializing in cash grains and cotton. Both officials and farm groups realized that rising Federal farm program costs and growing crop inventories could not be sustained indefinitely, particularly in light of growing Federal budget problems (figs. 8 and 9). They saw a need for commodity programs to become more market-oriented to reduce Government costs and make U.S. commodities more competitive in world markets. This major goal was incorporated into the Food Security Act of 1985, which called for an approximate 40-percent decline in wheat and corn loan rates after the 1983-84 production year. Because effective CCC loan rates were reduced, commodity prices declined to below the early 1980's levels. The average annual price of corn fell 52 percent between 1983 and 1987 before rising 46 percent in 1988, partly because of the drought that year.

Since 1985, the decline in support prices and in the trade-weighted dollar, and use of export subsidies and loan guarantees, have permitted U.S. farmers to regain

their competitive edge in commodity export markets. The value of U.S. agricultural exports rebounded about 35 percent between fiscal years 1986 and 1988 and may have increased another 8 percent in 1989. The move to more market-oriented agricultural policies has fostered export growth, but farmers are now less shielded from the influence of changing world supply and demand conditions. Thus, changes in crop production in other countries now result in larger swings in the prices U.S. farmers receive than was typical before 1985. Farmers still have the protection of target prices and direct payments from the Government.

Since 1987/88, target prices have declined 6 percent for feed and food grains and 9 percent for rice and cotton. Since early 1987, slightly lower target prices and higher market prices for most crops have been the major factors causing total Government outlays to farmers to decline from \$17 billion to \$10-\$12 billion during 1987-89.

The sum of direct payments and CCC loan payments to farmers will be about 7 percent of U.S. gross cash farm income in 1989, down from 12-13 percent in 1985-86. Thus, about 7 cents of every dollar of receipts and payments collected by farmers this year will be from the Federal Government.

Figure 8
Total Government payments to farmers increased during 1980's

Billion dollars

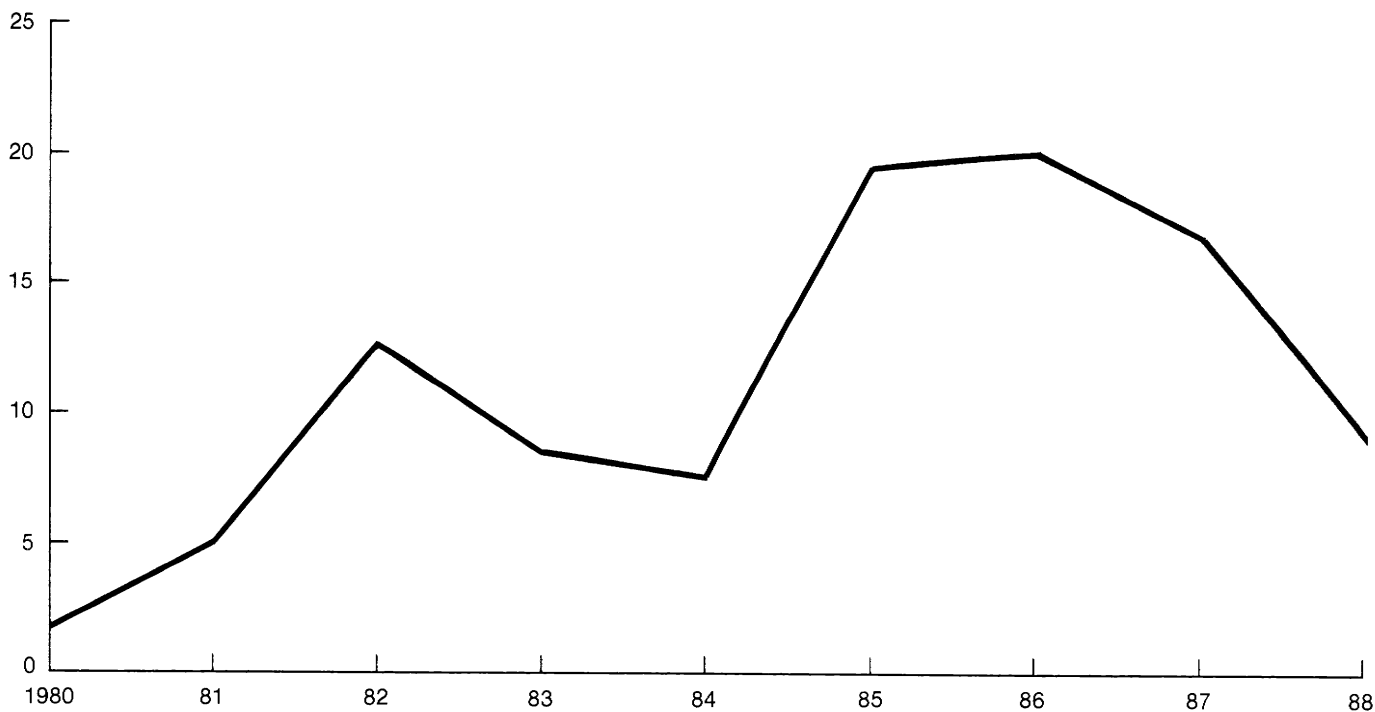
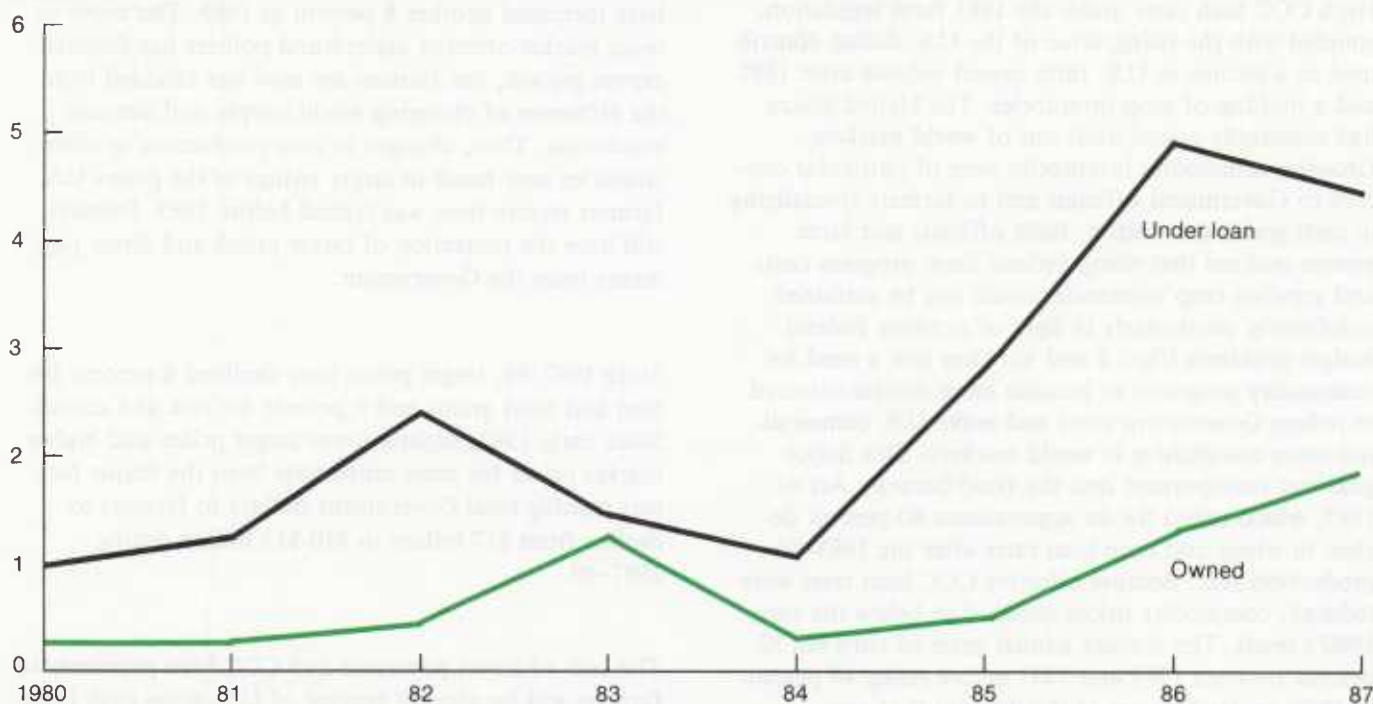


Figure 9

Corn under loan and owned by Commodity Credit Corporation increased during the 1980's¹

Billion bushels

¹As of December 31**Table 5—Nearly 76 percent of direct Government payments went to farms with sales of \$40,000–\$499,999 in 1988**

Annual farm sales	Share of U.S. payments	Major program commodity sales	Farms reporting payments	Percentage reporting	Payments as a percentage of gross cash income	Payments per reporting farm
-----Percent-----						1,000 dollars
Less than \$10,000	1	1	14	11	4	1.4
\$10,000–\$39,999	9	6	25	39	9	4.9
\$40,000–\$99,999	19	15	25	64	11	10.9
\$100,000–\$249,999	36	35	24	75	11	21.4
\$250,000–\$499,999	21	24	8	74	9	35.6
\$500,000 or more	14	19	4	63	4	56.7
United States	100	100	100	36	8	14.3

Who Gets Direct Government Payments?

Looking at who gets direct Government commodity payments provides insight into how total benefits are distributed among producers within the farm sector. Nationwide, about one in three farms reported receiving some of the \$14.5 billion in direct Government payments made in 1988. Most farms do not produce program commodities and, for those that do, not all participate for one reason or another. Recipient farms reported average payments of \$14,300 per farm. Participation and average payment vary substantially by size of farm, farm type, and geographic location.

Except for the largest farms (\$500,000 or more in farm sales), participation rates increase with size of farm (table 5). Also, average payment per participating farm increases with size of farm. These increases are consistent with the structure of the programs: the amount of the payment is directly related to the volume of production of the program commodity. Ninety percent of Government payments go to U.S. farms with sales of \$40,000 or more. Sixty-one percent of the recipients had sales of \$40,000 or more. About 14 percent of direct Government payments go to the 2 percent of U.S. farms with sales of \$500,000 or more. These larger farms are more likely to be large fruit and vegetable operations which are less likely to produce program commodities.

Table 6—Seventy percent of Government payments went to crop farms in 1988

Commodity	Share of U.S. payments	Major program commodity sales	Farms reporting payments	Percentage reporting	Payments as a percentage of gross cash sales	Payments per reporting farm
-----Percent-----						1,000 dollars
Cash grain	57	67	43	81	20	18.7
Cotton	7	11	3	90	16	32.8
Other crops	6	8	10	20	3	8.3
Beef, hog, sheep	22	12	32	23	5	10.0
Dairy	8	2	11	49	3	10.4
Other livestock	¹	¹	1	7	1	5.8
United States	100	100	100	36	8	14.3

¹ Less than 0.5 percent.

Table 7—Government payments, commercial farms, and crop production were concentrated in Midwest and Plains States in 1988

Region	Share of U.S. payments	Major program commodity sales	Farms reporting payments	Percentage reporting	Payments as a percentage of gross cash sales	Payments per reporting farm
-----Percent-----						1,000 dollars
Corn Belt	31	34	29	56	13	15.2
Northern Plains	21	16	18	75	13	16.5
Lake States	15	11	17	59	10	12.6
Southern Plains	10	9	8	24	7	16.3
Mountain States	6	5	4	28	6	21.1
Delta	6	9	4	23	11	21.5
Pacific States	4	5	2	11	3	24.8
Appalachian States	3	5	9	20	4	5.5
Southeast	2	5	5	20	3	6.9
Northeast	2	1	4	18	2	7.4
United States	100	100	100	36	8	14.3

Sixty-four percent of direct payments go to producers specializing in growing grains and cotton (table 6). Forty-six percent of all recipients specialized in grain and cotton production. Incidence of participation and average payment per recipient are also highest for these producers. Ninety percent of all cotton producers participated, and the average payment was \$32,800 per participant. Forty-four percent of all recipient farms specialized in livestock production (beef, hogs, sheep, dairy, and other livestock). However, the average size of payments to participating livestock producers was about half the level reported by grain producers.

Dairy farmers, particularly in the Northeast and Lake States, have long produced corn and other covered commodities for both feed and cash sale. About half the dairy farmers reported receiving direct payments although they constituted only 11 percent of all recipients. Dairy farmers also participate in milk price sup-

port programs which consist of regulated milk prices and substantial purchases of surplus dairy products by the Commodity Credit Corporation. Milk purchases are not included in the definition of direct Government payments and instead are a separate component of the CCC budget activities along with nonrecourse loans for crop commodities. Government dairy purchases were \$1.3 billion in 1988, down from \$2.3 billion in 1986.

Over half of all direct payments go to producers in the Corn Belt and Northern Plains where 56 and 75 percent of all farms were recipients in 1988 (table 7). Production of covered commodities, except cotton, is concentrated in those regions. The Midwest and Plains regions experienced the most severe financial stress during the mid-1980's. Higher incomes, improving land values, and record-high Government payments have recently contributed to a stabilizing farm economy in the major field crop producing regions.

Average payments of participating farms are highest in the Mountain, Delta, and Pacific regions, ranging from \$21,100 in Mountain States to \$24,800 in Pacific States. Wheat, cotton, and rice farms tend to be located in these regions, and their relatively large size results in larger payments than are typical in other regions.

General Effects of Farm Programs on Farms

Government payments helped farm operators meet their financial obligations during the 1980's period of income stress and major debt restructuring. Price supports and deficiency payments especially benefited cash grain farmers who were the hardest hit by declining commodity exports during the mid-1980's.

Government farm program benefits have become capitalized into land values over time. Subsidies limited the decline of land values in the mid-1980's by bolstering

farm income. Land price stabilization is important because about 60 percent of losses from farm loan defaults in the Midwest during the mid-1980's can be attributed to falling real estate values which provided collateral for loan repayment.

The Drought Assistance Act of 1988 provided a projected \$3.9 billion of Government aid to the farm sector during 1988 and 1989. Congress provided additional assistance for livestock producers affected by drought. These emergency relief programs limited the extent of severe financial stress to about 15,000 drought-stricken Midwest farmers. Federal multiperil insurance indemnities to farmers also increased from less than \$400 million in 1987 to about \$1 billion in 1988. Thus, the combination of farm commodity program subsidies, Federal drought assistance, and Federal crop insurance indemnities provided substantial income support to aid drought-stricken farmers in the hard-hit Midwest, as well as in other regions.

Federal Conservation Provisions

C. Tim Osborn*

A farmer's decision about how much and what land to put into crop production is fundamentally based on the assessment of production costs balanced against the anticipated crop yield valued by the combined market prices and Government support programs. Conservation is often a secondary consideration. For many years this balance of factors resulted in the farming of highly erodible land or land not suitable for cultivation with little concern for the environmental consequences.

With the passage of the Food Security Act of 1985, the factors determining a farmer's decision about production on marginal land significantly changed. Conservation considerations had to be more explicitly addressed. Some provisions of the law require farmers to comply with certain soil conservation restrictions to participate in commodity support programs. Others restrict the conversion of certain types of land into cropland.

Title XII of the 1985 Act contained several conservation provisions designed to reduce agricultural soil erosion and to protect wetlands. The conservation reserve program (CRP) and conservation compliance provision appear to have the greatest potential for affecting the U.S. farming sector. The sodbuster and swampbuster provisions will probably not affect large numbers of farms.

The CRP is a voluntary long-term cropland retirement program. Under this program, the USDA pays participating farmers to retire highly erodible cropland from production for 10 years. The CRP is meant to retire 40–45 million acres of highly erodible cropland by the end of the 1990 crop year, about 10 percent of the Nation's total cropland. The major effects of the CRP on the farm sector will be (1) reduced crop production which may be accompanied by higher commodity prices leading to higher net farm returns, (2) annual rental payments made by USDA to participating farmers, (3) less damage to the environment and to soil productivity because of reduced erosion, (4) lower Government costs

for commodity programs, and (5) possible reductions in economic activity in localized rural economies where enrollment may be heavy.

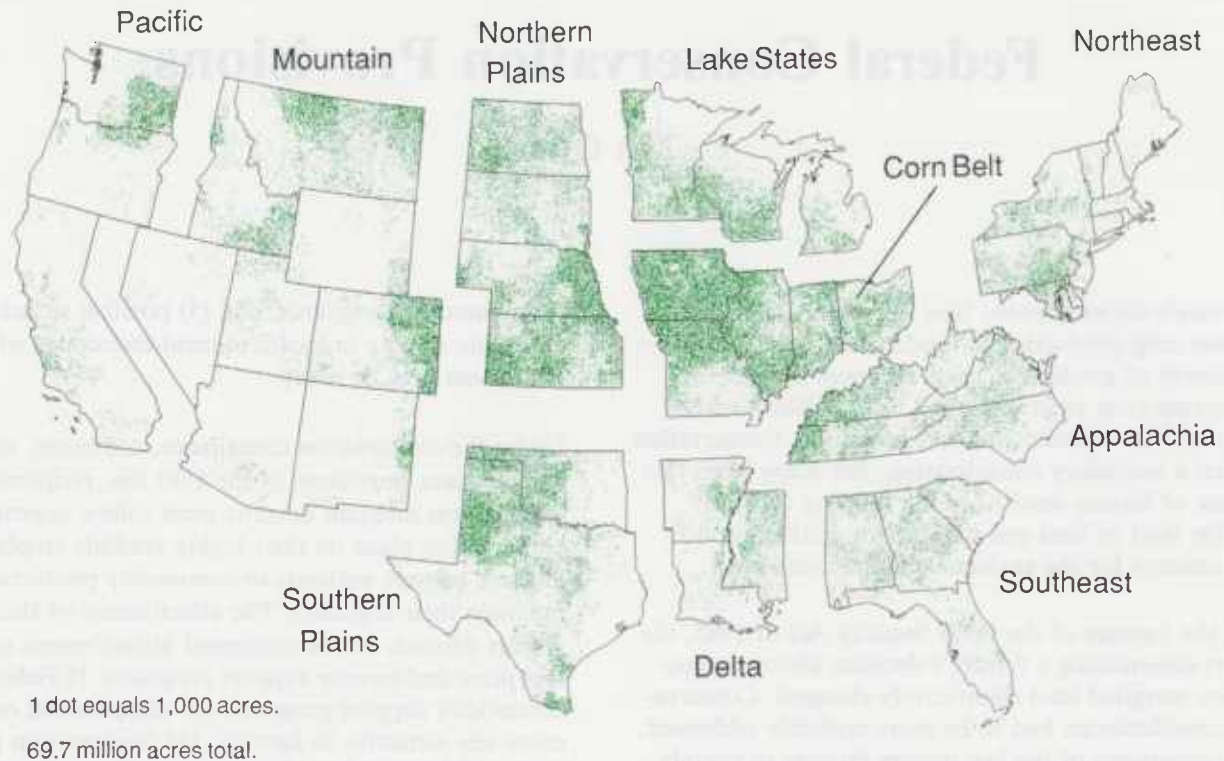
Under the conservation compliance, sodbuster, and swampbuster provisions of the 1985 law, recipients of USDA farm program benefits must follow approved soil conservation plans on their highly erodible cropland and not convert wetlands to commodity production to maintain their eligibility. The effectiveness of these provisions depends on the continued attractiveness of Federal price and income support programs. If Federal commodity support programs are discontinued or become less attractive to farmers, the conservation provisions will become less effective in achieving their goals.

Not counting land that will be enrolled in the CRP and highly erodible cropland already in compliance, an additional 10 percent of U.S. cropland will require conservation treatment under the conservation compliance provision. Farmers who use this land will probably change tillage practices or crop rotations, or both, as prescribed by Soil Conservation Service field office technical guides to preserve their eligibility for USDA program benefits. Because conservation systems in the field office technical guides must be economically feasible, large changes in production costs or crop supplies from conservation compliance are unlikely. Other land, potentially subject to conservation compliance, is already considered in compliance or may be enrolled in the CRP.

The conservation provisions in the 1985 Act provide some consistency between Federal conservation efforts and commodity support policies. In the past, commodity programs and conservation programs have been criticized for working at cross-purposes. Some critics have claimed that Federal commodity programs have provided incentives for producers to farm intensively on existing cropland and to convert fragile land to cropland with little concern for the environmental effects. The conservation provisions of the 1985 Act try to reduce this inconsistency by giving farmers an incentive to produce in a manner that promotes conservation goals.

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Figure 10
Cropland eligible for the conservation reserve program by farm production region



The Conservation Reserve Program

The CRP is a voluntary long-term retirement program for highly erodible cropland that simultaneously achieves both environmental and supply control benefits. In exchange for retiring highly erodible cropland for 10 years, the USDA pays CRP participants (farmowners or operators) an annual per acre rent and half the cost of establishing a permanent land cover (usually grass or trees). This cover may not be used for commercial purposes, such as haying or grazing, except under declared emergency conditions.

With an enrollment target of 40–45 million acres by the end of 1990 (about 10 percent of U.S. cropland), the primary goal of the CRP is to reduce soil erosion. Its secondary objectives include protecting the Nation's longrun ability to produce food and fiber, reducing sedimentation, improving water quality, fostering wildlife habitat, curbing the production of surplus commodities, and providing income support for farmers.

An estimated 101 million acres of highly erodible cropland are eligible for CRP enrollment. Most of this cropland is located in the Corn Belt, Northern Plains, Southern Plains, and Mountain regions. Eligible acreage is further concentrated within these regions. Enrollment in the CRP may not exceed 25 percent of the cropland in any county unless a waiver is requested by

county officials. This limitation effectively reduces CRP-eligible cropland to 70 million acres (fig. 10). If the Secretary of Agriculture determines that exceeding this limit will not seriously depress the county's farm supply and service sector, up to 35 percent of the county's cropland may be enrolled.

The CRP provides landowners with a means of retiring highly erodible cropland to meet the conservation compliance provision. In turn, conservation compliance results in a more cost-effective CRP because farmers who would be subject to compliance should be willing to accept lower rental payments for retiring their highly erodible cropland. Finally, a portion of the land retired under CRP may remain in retirement after the 10-year contract period because it will be subject to conservation compliance if it is returned to crop production in the future.

The CRP also works in conjunction with the annual acreage reduction program (ARP) to control the production of surplus crops. The ARP requires farmers to set aside a certain proportion of their land as a condition for receiving deficiency payments. Annual adjustments in the ARP levels permit the Secretary to control USDA program expenditures. As CRP acreage increases, the need to set aside cropland on an annual basis decreases.

Following the eighth signup period in February 1989, about 30.6 million acres had been enrolled in the CRP, representing nearly 300,000 farmer contracts. Most of this enrollment was in the Northern and Southern Plains and the Mountain States (fig. 11). Since 1986, average annual CRP rental rates received by farmers have increased from \$42 per acre for the first signup to over \$51 per acre for the eighth signup. The per acre rental rate for all 30.6 million acres averages \$48.70.

Erosion reductions generated by CRP enrollment have steadily declined with each signup because of changes in the land withdrawn from production. After the initial signup, erosion declined by an annual average of 27 tons per acre. By the eighth signup, average annual erosion reductions had fallen to 14 tons per acre.

Retirement of land via the CRP will provide participating farmers with a dependable 10-year stream of income in the form of USDA rental payments. Expenditures for rental payments may reach an annual maximum of \$2.5 billion from 1990 through 1995 if the full 45 million acres of cropland are retired. After 1995, total expenditures for rental payments decline as land initially enrolled begins to leave the program.

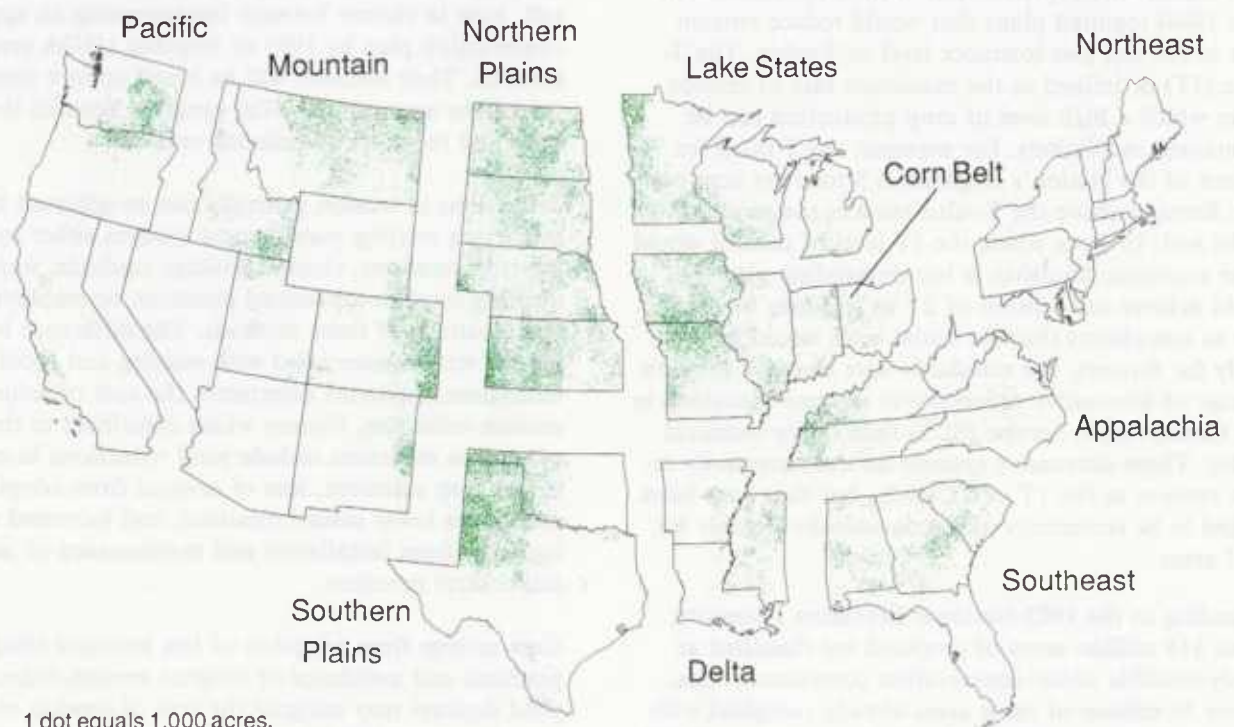
As the amount of land used for crop production declines as a result of CRP, stocks of surplus commodities may decline and market prices may rise. For a 45-million-acre CRP, the present value of the total additional farm in-

come over the 1986-99 period resulting from increased commodity prices is \$9-\$20 billion. Those who plant trees on their CRP acres will also derive future income from the sale of forest products. Conversion of 3.5 million acres of cropland to tree production should increase the wealth of landowners by \$4-\$5 billion.

As land is retired through the CRP and total crop production declines, total crop production costs will also probably decline. Other costs will probably rise, because the farmer must pay for at least 50 percent of cover establishment costs and must maintain the cover for the duration of the CRP contract. Average per acre production costs increase as fixed costs for items such as machinery and land must be spread over a smaller cropland base. Average production costs may also increase if farmers increase the use of fertilizers and pesticides to promote greater yields from their non-CRP cropland.

Over its full life, the CRP will cost the Federal Government an estimated \$21.5-\$22.8 billion for rental payments, corn bonus payments, cover crop establishment cost sharing, and technical assistance. These costs are partially offset by an estimated \$16-\$20 billion reduction in Commodity Credit Corporation (CCC) payments to farmers. However, estimates of the reductions in CCC payments resulting from the CRP are highly sensitive to assumptions concerning the levels of

Figure 11
Conservation reserve program enrollment by farm production region, February 1989



1 dot equals 1,000 acres.

30.59 million acres enrollment through February 1989.

supply control programs that would have existed if the CRP had not been implemented. If one assumes that traditional supply control programs would have expanded in the absence of the CRP, CCC cost savings would be significantly less.

Conservation Compliance

Conservation compliance will require U.S. farmers to obtain an approved soil conservation plan for their highly erodible cropland by January 1, 1990, and fully implement the plan by January 1, 1995. Failure to comply causes producers to lose eligibility for USDA program benefits for their entire farming operation during the year(s) not in compliance. Affected USDA program benefits include price support loans, purchases, and payments for program crops; Federal crop insurance; disaster payments; farm storage facility loans; payments for storage of CCC-owned commodities; and new loans made, insured, or granted by the Farmers Home Administration.

The primary objective of conservation compliance is to reduce erosion on highly erodible cropland by requiring that recipients of USDA program benefits use farming systems consistent with soil conservation. The provision has the potential to alter the methods which farmers use to farm their highly erodible cropland and, thus, may affect farm income.

Conservation plans for fields designated as highly erodible are to be jointly developed by the farmer and the local conservation district. Initial rules (established in June 1986) required plans that would reduce erosion rates to the soil loss tolerance level or T-value. The T-value (1T) is defined as the maximum rate of erosion under which a high level of crop production can be maintained indefinitely. For example, the T-value for 71 percent of the Nation's cropland is 5 tons per acre per year. Erosion above the T-value reduces the productivity of the soil. In cases where the 1T level of control would cause economic hardship, a less demanding plan that would achieve soil erosion of 2T or less may be used. Due to complaints that the initial rules would be too costly for farmers, the standards were changed to allow a range of alternative conservation systems contained in Soil Conservation Service (SCS) field office technical guides. These alternative systems do not necessarily reduce erosion to the 1T or 2T levels, but they have been judged to be technically and economically feasible for local areas.

According to the 1982 National Resources Inventory, about 118 million acres of cropland are classified as highly erodible under conservation compliance rules. About 35 million of these acres already complied with existing cropping practices. As much as another 40 mil-

lion acres that would have been subject to compliance may be enrolled in the CRP. Thus, at least 43 million acres of cropland will still require new treatment under the conservation compliance provision (about 10 percent of U.S. cropland). However, when a field consists of one-third highly erodible land or 50 acres of highly erodible land, whichever is less, the entire field is considered highly erodible. Thus, considerably more than 43 million acres may be affected. Nearly 30 percent of this land will be located in the Corn Belt region. The Southern Plains, Mountain States, and Northern Plains regions will also contain large amounts of cropland subject to treatment under conservation compliance.

Farmers with highly erodible fields not already in compliance must decide by 1990 whether to place their cropland in the CRP, incur the cost of implementing an approved conservation plan to be completed by 1995, thus retaining eligibility for USDA program benefits, or continue farming as they have, thus avoiding the implementation costs of a conservation plan while forgoing USDA program benefit eligibility. To make this decision, farmers must weigh the relative costs and benefits of each alternative.

Placing land into the CRP might be attractive to some farmers, but it is not a universal solution to conservation compliance. Under current rules, total enrollment in the CRP is limited to 40-45 million acres and is limited to no more than 25 percent of a county's cropland. Any land enrolled in the CRP will become subject to conservation compliance again after the 10-year CRP contract expires. Farmers who cannot or do not enroll their highly erodible acreage in the CRP will, as a result, have to choose between implementing an approved conservation plan by 1995 or forgoing USDA program benefits. Their decision will be based upon a comparison of the amount of USDA program benefits they receive and the costs of reducing erosion.

Reductions in erosion generally can be achieved by modifying existing management systems either by altering crop rotations, changing tillage methods, implementing mechanical control practices, or employing combinations of these methods. The difference between the net returns associated with existing and modified management systems determines the cost of achieving erosion reduction. Factors which contribute to the cost of erosion reduction include yield reductions in maintained crop rotations, loss of revenue from adoption of alternative lower valued rotations, and increased operating costs from installation and maintenance of mechanical control practices.

Cost savings from adoption of less intensive tillage practices and avoidance of longrun erosion-induced yield declines may mitigate the cost of erosion reduction. For some highly productive farms, these mitigat-

ing factors may more than offset revenue losses due to yield declines, resulting in an increase in net farm returns due to conservation. If the farmer's cost for implementing an approved conservation plan on highly erodible acreage exceeds the value of USDA program benefits received for all of the acreage, then the farmer would probably forgo program payments, if the remaining farm income is sufficient to sustain the farm business. If the farmer's USDA program benefits exceed the cost of an approved conservation plan for the highly erodible acreage, however, the farmer would probably implement the plan to preserve eligibility to receive those benefits.

The effects of conservation compliance on the farm sector are difficult to estimate, because compliance rules have been eased from the strict 1T conservation plan standard to allow conservation systems contained in SCS field office technical guides. Considerable variability will probably exist in the selection of conservation systems due to differences in State conservationists and soil and water conservation committee decisions. However, because the field office technical guide systems must be economically feasible, changes in farm production, production costs, and net returns to the farm sector will probably not be great.

Sodbuster

The sodbuster provision requires that farmers who convert highly erodible land to production of agricultural commodities must implement an approved conservation plan or forfeit their eligibility for USDA program benefits on their entire farming operation. Affected benefits are the same as under the conservation compliance provision. Conservation compliance applies to highly erodible land already in crop production, but the sodbuster provision relates to highly erodible land currently in native vegetation that may be brought into production.

The sodbuster provision requires conservation plans that will maintain erosion at or below the 1T level. This requirement provides a strong disincentive for farmers to extend production to highly erodible land to increase their USDA program payments. The sodbuster provision took effect with passage of the Food Security Act of 1985.

About 227 million acres of land with potential for conversion to cropland are subject to the sodbuster provision. Because of farm economic conditions which have existed since sodbuster became effective in late 1985, few farmers have converted highly erodible land to cropland and thus relatively few violations have been recorded. Higher future commodity prices, however, could provide farmers with greater incentives to expand production to areas not currently cropped. As commod-

ity prices increase, however, Government deficiency payments decrease, reducing most of the current penalty associated with sodbusting. Thus, the sodbuster provision may not achieve environmental goals during periods of high commodity prices.

Through February 1989, only 494 producers had been determined ineligible for program benefits because of sodbuster violations. More of these producers (135) were in Iowa than elsewhere. Most of the violations have been appealed. Of 367 appeals received through February 1989, 315 producers won relief through a USDA appeals process. Only 19 did not, while 33 were still pending.

Swampbuster

The swampbuster provision is contained in the wetland conservation subtitle of the Food Security Act of 1985. Swampbuster denies USDA program benefits to farmers who convert wetlands for the production of agricultural commodities after 1985. Like the sodbuster provision, the same USDA program benefits are affected for a farmer's entire farming operation. Of the 8 million wetland acres converted to other uses between 1955 and 1975, 87 percent was converted for agricultural uses. In their natural state, wetlands provide numerous environmental benefits including wildlife and waterfowl habitat.

Of an estimated 78 million acres of U.S. wetlands remaining, only 17 million acres are suitable for conversion to cropland. Swampbuster will probably be effective in preventing conversion of about 6 million of these acres that depend heavily on USDA program payments. If commodity prices rise and deficiency payments become less important, farmers would be less concerned about losing eligibility for USDA program benefits as a result of swampbusting.

Through February 1989, only 345 farmers had been determined ineligible for program benefits because of swampbuster violations. Most of these farmers (222) were in Minnesota, and most of the violations have been or are under appeal. Of 337 appeals received through February 1989, 206 cases had the original determination overturned. Only 71 appeals were not approved, and 60 are still pending. A total of 4,524 commenced determinations have been requested by farmers. In these cases, a farmer seeks an exemption on a wetland conversion which may have begun before the effective date of swampbuster enforcement. Of these, 2,032 have been approved, 379 have not been approved, and 2,113 are still pending. Wetlands that were cropped in at least 2 of the years between 1981 and 1985 may be enrolled in the CRP beginning with the eighth signup (February 1989).

Federal Income Tax Policy

Ron L. Durst*

Federal tax policies affect investment and production decisions in agriculture through the effect of taxes on the relative prices of the various inputs used in farming, and their effect on the level at which various sources of farm income are taxed. Tax policies may change the level of output by altering the input mix or by increasing or decreasing the quantity of resources committed to farming. Tax policies also affect the organization of resources by favoring one form of business organization over other forms.

The magnitude of these tax policy effects on agriculture and their importance compared with commodity, credit, and other Government programs and policies is uncertain. However, tax policies have been recognized as playing a role in the changes that have occurred within the sector throughout the 1970's and early 1980's.

Pre-1986 Policies

The Federal income tax system throughout the 1970's and early 1980's contained relatively high marginal tax rates and numerous exclusions, deductions, and credits that gave taxpayers both the incentive and the opportunity to shelter income from taxation. Both farmers and nonfarm investors exploited those special income tax rules applicable to agricultural investments. For farmers and nonfarm investors alike, taxes frequently played a major role in their decisions concerning investment, production, financing, marketing, and the organizational structure of their farm operations.

Special income tax rules applicable to agriculture included the use of cash accounting rules, the current deductibility of capital costs, and capital gains treatment of income from assets for which costs may have been deducted as a business operating expense. These provisions frequently provided current tax benefits that greatly exceeded any future tax liabilities associated with the investment. Tax provisions encouraged additional

investments in farming that had little to do with their long-term profitability in terms of farm income, but a lot to do with using the current tax benefits to offset income unrelated to farming. The net result was an increase in production of most agricultural products, but especially livestock and perennial crops such as citrus, almonds, grapes, avocados, and pistachios.

The magnitude of these tax-motivated investments in farming is uncertain. However, farm tax losses were prevalent throughout the period suggesting that the amount was not insignificant. From the early 1970's to the early 1980's, the number of farm sole proprietorships reporting losses for tax purposes increased from about one-third to two-thirds of all farm sole proprietors, with a net loss in some years exceeding \$10 billion. Most farm partnerships also reported losses for tax purposes. Thus, billions of dollars in nonfarm income were sheltered from taxes.

Investment

Incentives for investment in depreciable capital promoted purchases of farm machinery and equipment and the construction of certain farm structures. Accelerated depreciation in combination with the investment tax credit offered extremely low tax rates for investment in most types of depreciable farm capital. Nearly 20 percent of net investment in agricultural equipment over a 30-year period beginning in 1956 has been attributed to favorable tax policies for investment in depreciable capital.

Land

Land received more favorable tax treatment than many other investments, affecting land ownership and land values. Carrying costs, such as nominal interest expenses and property taxes, were deductible when incurred. In contrast, the appreciation in the value of land was taxed at a favorable capital gains rate and deferred until the land was sold. The optimistic expectations regarding appreciation in land values that existed during the 1970's made an investment in land seem an excellent opportunity to shelter current income in ex-

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change for appreciation taxed at very favorable rates at some point in the future. Incentives for land investments were greater for those in higher tax brackets, those who borrowed to buy land, and those who held their land for long periods before resale. The result was higher land values, greater concentration of landownership, greater debt loads and risk for landowners, and a less active land market.

Conservation and Resource Use

For over 30 years, farmers were allowed to claim immediate tax deductions for certain types of soil and water conservation expenditures. Farmers' decisions with regard to soil and water conservation and management were frequently based more on the tax savings associated with such expenditures than on the conservation benefits. Farmers have also been allowed to claim immediate tax deductions for most expenditures on land clearing and land improvements. The immediate deductibility of land-clearing expenses, in combination with the generally favorable tax treatment of land, encouraged the conversion of wetlands and other land into cropland. Deductible expenditures on land improvements such as drainage and preparations for irrigation also often led to more intensive use of land that resulted in increased soil erosion.

Organizational Structure

The number of farm corporations more than doubled from 25,677 in 1969 to 56,839 in 1982. Several factors may have contributed to this increase, and Federal tax policies were undoubtedly significant. Corporate income and individual income are subject to different tax rates. Throughout the 1970's and early 1980's, corporate rates were generally lower and less progressive than individual tax rates. Various fringe benefits, such as life and health insurance, pension and profit sharing plans, and even housing, could be provided by the corporation and deducted as a business expense. In most cases, these benefits were also excluded from the employees' income. Similar benefits provided by farms operated as sole proprietorships or partnerships were generally not deductible or deductible in lesser amounts. Thus, Federal tax policies encouraged farmers to incorporate to reduce their tax liability.

The tax savings available by operating as a farm corporation could be paid to the owners either as dividends or wages, could be retained in the business, or could be used to expand the farm operation. Since retained earnings might be subject to an additional tax, and dividends and wages would result in additional Federal individual income tax liability, the tax savings from incorporating were frequently reinvested in the operation. Thus, Federal tax policies not only encouraged

farmers to incorporate, they also encouraged the use of the tax savings from incorporation to expand the farm operation.

The Tax Reform Act of 1986

The Federal income tax system that existed before the Tax Reform Act of 1986 contained more than 100 provisions for economic incentives or tax relief to various groups of taxpayers. Taxpayers used the numerous deductions, exclusions, and credits available under the prereform income tax system to greatly reduce and in some cases eliminate their tax liability. Thus, taxpayers with similar economic incomes frequently faced very different tax burdens.

By 1985, dissatisfaction with the Federal tax code led to a series of proposed overhauls to provide a more efficient, equitable, and simpler tax system. These proposals prompted a national debate on tax policy which eventually led to the enactment of the Tax Reform Act of 1986.

The Tax Reform Act of 1986 was the most comprehensive overhaul of the Federal income tax system in over 30 years. The act substantially reduced marginal tax rates and broadened the income tax base by eliminating many of the exclusions, deductions, and credits that had been introduced into the tax code over the years. Agriculture, like other sectors of the economy, was affected by the changes in many of these special provisions.

The effect of the Tax Reform Act on an individual farmer's tax liability depends on a number of factors including the type and size of the operation. For many farmers, the tax burden will be lower or about the same, because lower marginal tax rates and the larger standard deduction and personal exemption offset the loss of various tax benefits. However, those farmers who had received substantial benefit from the investment tax credit and the capital gains exclusion will probably face higher taxes.

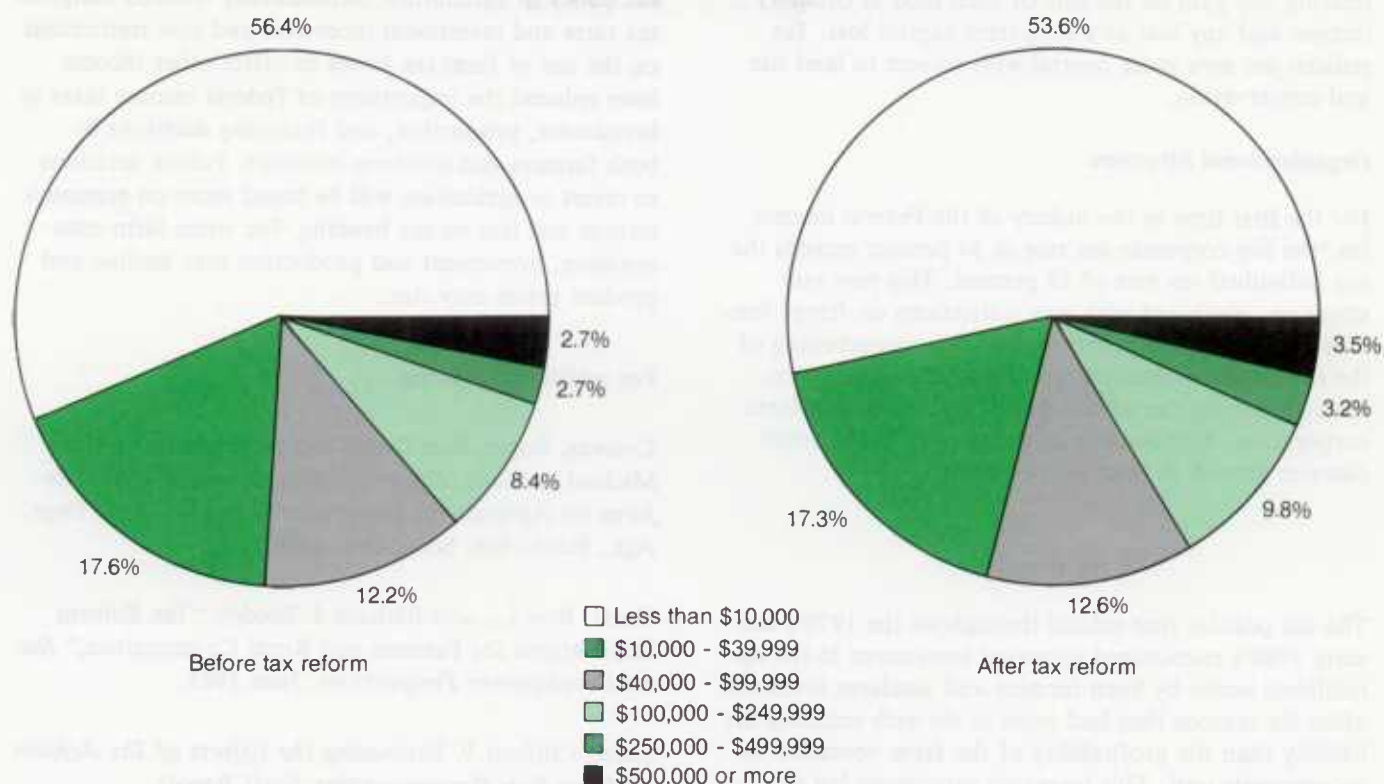
An analysis of the effects of the Tax Reform Act estimated that aggregate Federal income tax liabilities for farm sole proprietors should decline slightly. That analysis also suggested that the act shifted the tax burden from those farmers with the lowest farm business receipts toward those with the highest farm business receipts (fig. 12).

Investment

Although the Tax Reform Act of 1986 has important effects on farm tax liabilities, the effects that the act

Figure 12

Distribution of Federal income taxes for farm sole proprietors by size of farm business receipts



had on investment, production, and management decisions by both farmers and nonfarm investors in farming are of greater significance. The act changed a number of tax provisions that have a major influence on such decisions. These new provisions include limits on the ability to use cash accounting to prepay expenses, repeal of the capital gains exclusion, and new requirements to capitalize some development expenditures. New limits on a taxpayer's ability to deduct passive farm losses against other income is another important change. These changes will increase tax and compliance costs for many farmers, but they should also greatly reduce the incentive for tax shelter investments by nonfarm investors in orchard and vineyard development and various livestock operations.

Tax reform also reduced incentives for investment in depreciable capital. The investment tax credit was eliminated, while depreciation deductions were made less favorable by extending the recovery period for most assets. These changes should result in reduced investments in farm machinery, equipment, and some structures.

Debt Financing and Restructuring

The Tax Reform Act reduced the incentive for high-income individuals to make debt-financed purchases of farmland. Although nominal business interest expenses remain fully deductible, lower marginal tax rates, the

repeal of preferential treatment for long-term capital gains, and limits on the deductibility of farm losses against other nonfarm income have eliminated many of the tax benefits of highly leveraged investments in farmland by high-income investors.

The act also reduced inconsistencies with various credit policies. Tax policies had previously discouraged farmers' participation in debt-restructuring programs. Many farmers who had debts discharged either through a debt-restructuring program or by turning over the property to the lender were liable for taxes based on the difference between the amount of the debt written off and their original cost or other basis in the property. Under the new law, "qualifying farm debt" discharged or written down by an unrelated lender will not be treated as income. This change removed a major barrier to the success of debt-restructuring programs for some farmers.

Conservation and Resource Use

The 1986 Act restricted or eliminated many of the special tax benefits that adversely affected conservation efforts. Soil and water conservation expenses now are deductible only if they are consistent with a conservation plan approved by USDA or a comparable State agency. Deductions for land-clearing expenditures were completely repealed. The act discourages the conversion

of wetland or highly erodible land into cropland by treating any gain on the sale of such land as ordinary income and any loss as a long-term capital loss. Tax policies are now more neutral with respect to land use and conservation.

Organizational Structure

For the first time in the history of the Federal income tax, the top corporate tax rate at 34 percent exceeds the top individual tax rate of 28 percent. This new rate structure, combined with new restrictions on fringe benefits available to corporations and the strengthening of the tax imposed upon liquidation of the corporation, has reduced the tax advantages of operating as a farm corporation. This leveling of the playing field should dampen growth in farm corporations.

Summary

The tax policies that existed throughout the 1970's and early 1980's encouraged increased investment in the agricultural sector by both farmers and nonfarm investors, often for reasons that had more to do with reducing tax liability than the profitability of the farm operation as an economic unit. This increased investment led to higher land prices, increased production of many agricultural products, and downward pressure on commodity prices.

The Tax Reform Act of 1986 clearly shifted the role of tax policy in agriculture. Substantially reduced marginal tax rates and investment incentives and new restrictions on the use of farm tax losses to offset other income have reduced the importance of Federal income taxes in investment, production, and financing decisions by both farmers and nonfarm investors. Future decisions to invest in agriculture will be based more on economic returns and less on tax benefits. For some farm commodities, investment and production may decline and product prices may rise.

For additional reading . . .

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Farm Credit Conditions and Policy

Douglas G. Duncan*

The fortunes of farms and the credit institutions serving them are closely interwoven through credit markets that provide the financial capital for the farm sector. Farmers depend on agricultural credit institutions for the debt-financed portion of input purchases. Agricultural production requires the use of short-term inputs (1–3 years, such as seed and fertilizer), intermediate inputs (3–10 years, such as machinery and livestock), and long-term inputs (such as land). These inputs are purchased with a combination of equity and debt capital. Financial capital is also required for improving efficiency, through replacement or addition of machinery, and expansion of operations, through purchasing land or buildings, according to the farmer's assessment of expected profitability. Demand for credit will vary accordingly.

Financial institutions meet farmers' credit demands by serving as intermediaries for the funds of depositors. Lenders survive and prosper according to the performance of assets, including farm loans, in which they invest deposited funds. Agricultural lenders must assess the performance potential of the individual farmer and of the overall farm sector when making their lending decisions. The effect of Government policy is an important factor in the sector's performance potential. Although lenders play an essentially passive role as credit suppliers, they can encourage or discourage borrowing by farmers according to the terms of credit supplied.

Changes in either demand or supply can affect both farmers and agricultural lenders. Easy credit terms based on an overly optimistic assessment of farm income prospects can cause problems for both borrowers and lenders. Falling incomes impair farmers' ability to repay loans, which in turn weakens lender performance. Such a scenario leads to reduced debt by farmers and credit extension by lenders.

The history of the agricultural credit system over the last two decades illustrates how this relationship between farm borrowers, who demand credit, and agricultural lenders, who supply credit, plays out under different farm and credit conditions. The 1970's saw unprecedented growth and prosperity for the farm sector. Farm income was high, fueling growth in land values. The economic conditions created a confidence in the future of the sector that encouraged growth in agricultural borrowing, which allowed farmers and agricultural lenders alike to benefit from the good times.

When the high expectations for the farm sector proved unsustainable and the farm recession of the early and mid-1980's hit, the financial condition of both farmer borrowers and agricultural lenders declined. The deterioration of farm financial performance was followed closely by problems among farm lenders. Subsequently, debt levels declined substantially as both farmers and their lenders adjusted to the new conditions. More recently, conditions within the farm sector have improved. However, as a legacy of the farm recession, both borrowers and lenders are adopting a more cautious approach to credit use and availability.

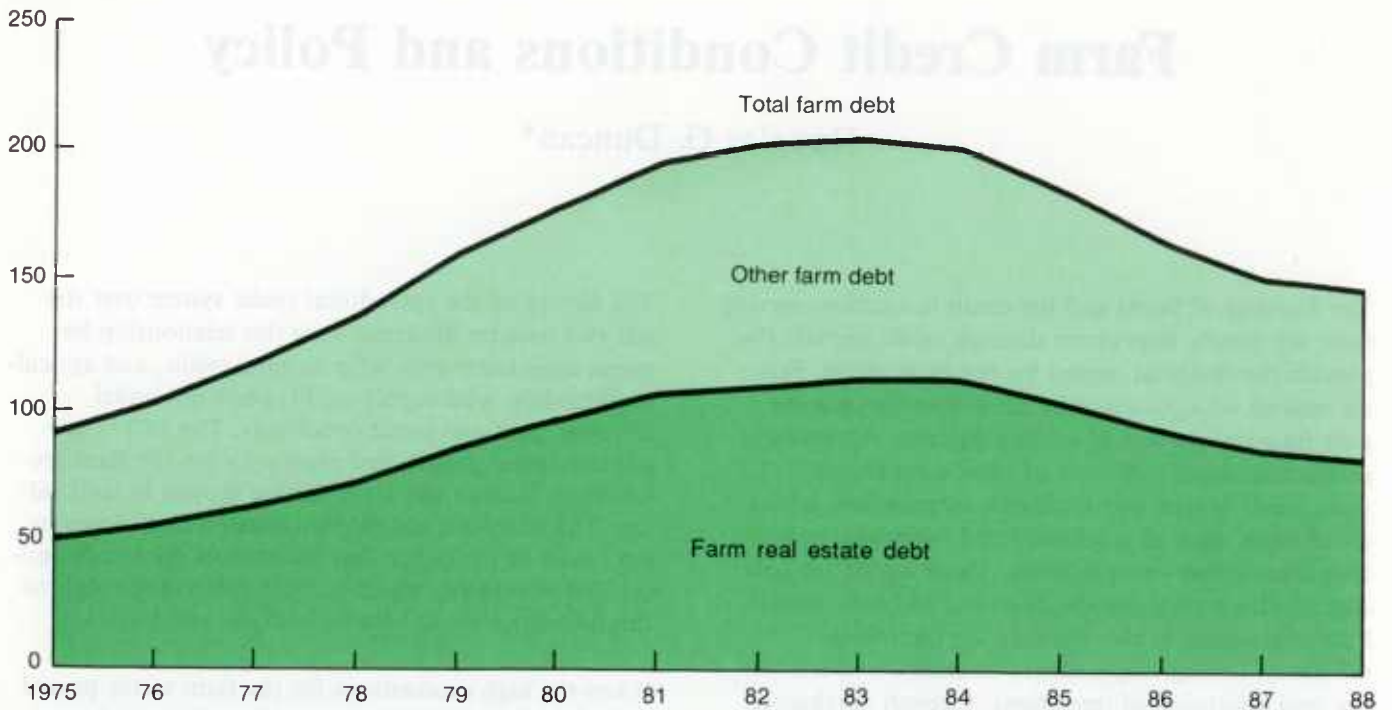
Agricultural Credit Use Grows

Total U.S. farm debt has grown steadily since World War II. Before the 1970's, total farm debt doubled about every 10 years. During the 1970's, however, farmers expanded their debt levels threefold from \$53 billion in 1970 to \$179 billion in 1980 (fig. 13). By 1983, nominal farm debt (excluding household debt) was almost 400 percent above the level in 1970 (160 percent in real terms). The aggressive debt expansion was a reaction to several factors. A surge in exports in the first half of the decade boosted farm income. Projections of continued relative food scarcity combined with high current incomes raised farmer expectations for profitability. Low real interest rates in concert with high income expectations encouraged farmers to bid up land prices. Debt per acre of farmland increased from \$44 in 1970 to \$188 in 1983.

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Figure 13
Farm debt

Billion dollars



Farm loans outstanding as of December 31. Includes farm household debt.

Agricultural lenders, sharing farmers' positive expectations about farm incomes, expanded credit extension to farmers by relying heavily on appreciating land values as collateral for increased borrowing. The three largest groups of lenders to farmers, the Farm Credit System (a quasi-governmental lender), individuals, and commercial banks, accounted for over 80 percent of the credit provided to farmers through the early 1980's (fig. 14).¹ The Farmers Home Administration (FmHA), a Government lender of last resort to farmers, had played a relatively minor role in the total farm credit picture until the 1980's. All lender groups increased their loan volume to farmers during 1975-83, but growth rates for FmHA and the Farm Credit System exceeded those for the other groups (fig. 15). Lenders accommodated the expansion by altering the basis of their lending decisions.

A simple traditional method used to value an asset, land for instance, is to divide its annual profit potential by the rate of interest. Land prices in the late 1970's exceeded values computed in this manner in many instances. In fact, farmers computed land prices by discounting annual income and including capital appreciation. Thus, even if a farmer's annual income was

insufficient to qualify for a land purchase, the farmer might borrow against currently owned land to qualify for the purchase. The gain to be made on a future sale of the land at higher prices might more than offset near-term shortfalls.

This profitability scenario relied on constantly increasing land prices. Lenders had traditionally used repayment capacity as one measure for evaluating loan applications.² Then lenders shifted to basing more of their decision upon collateral, in most cases land. The lenders essentially shared the farmers' optimism about continued growth in agricultural land values and built those assumptions into their loan decisions. This change encouraged the expansion of farm debt that peaked in 1983 at \$193 billion (excluding household debt).

Credit's Role in Farm Structure Changes

The growth in credit played an important role in the structural change of the farming sector into the 1980's. Farmers had been making greater use of readily available, low-cost credit to acquire both productive assets,

¹ The Farm Credit System is a borrower-owned cooperative which acquires the funds it lends by selling securities which have "agency status." This status implies a Government guarantee against default, thus making the system "quasi-governmental."

² Repayment capacity = Net farm income + Depreciation - Withdrawals for family living and other purposes.

Figure 14

Individuals, commercial banks, and the Farm Credit System hold most farm debt

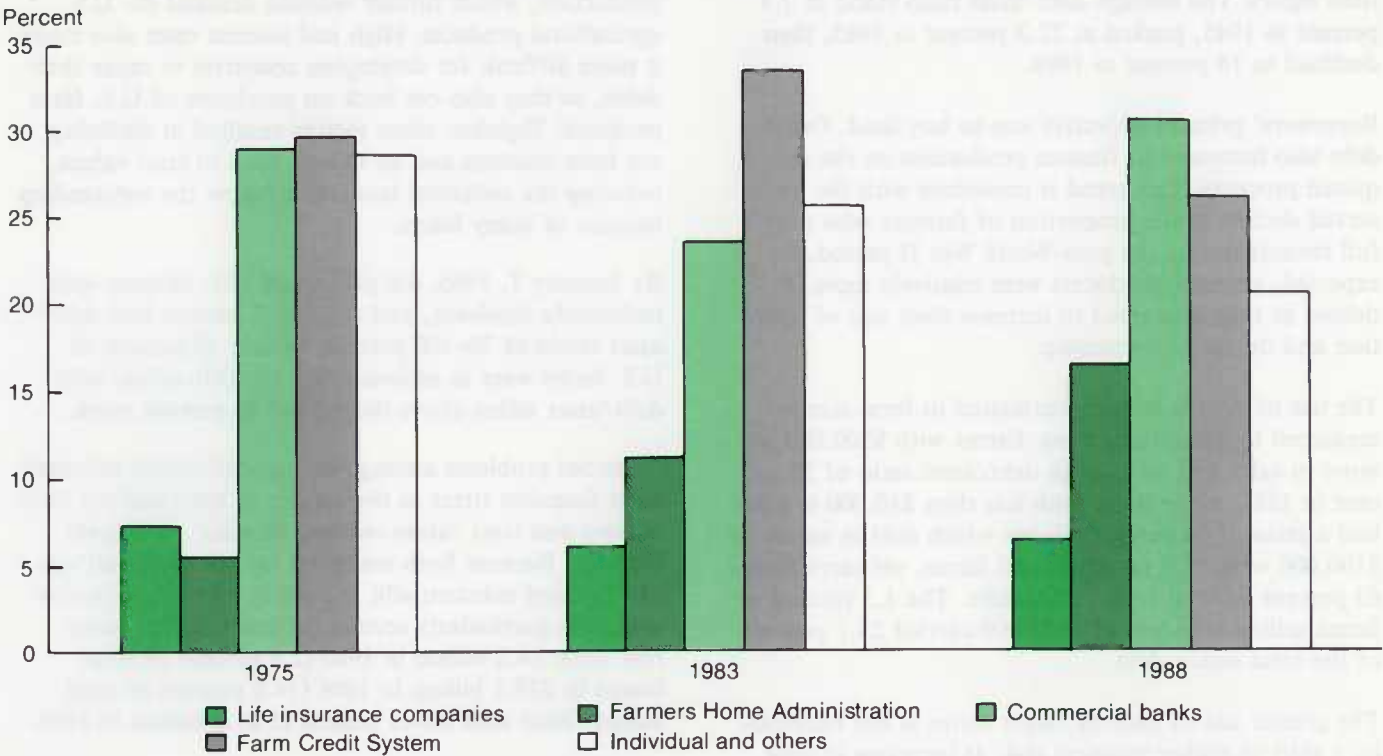
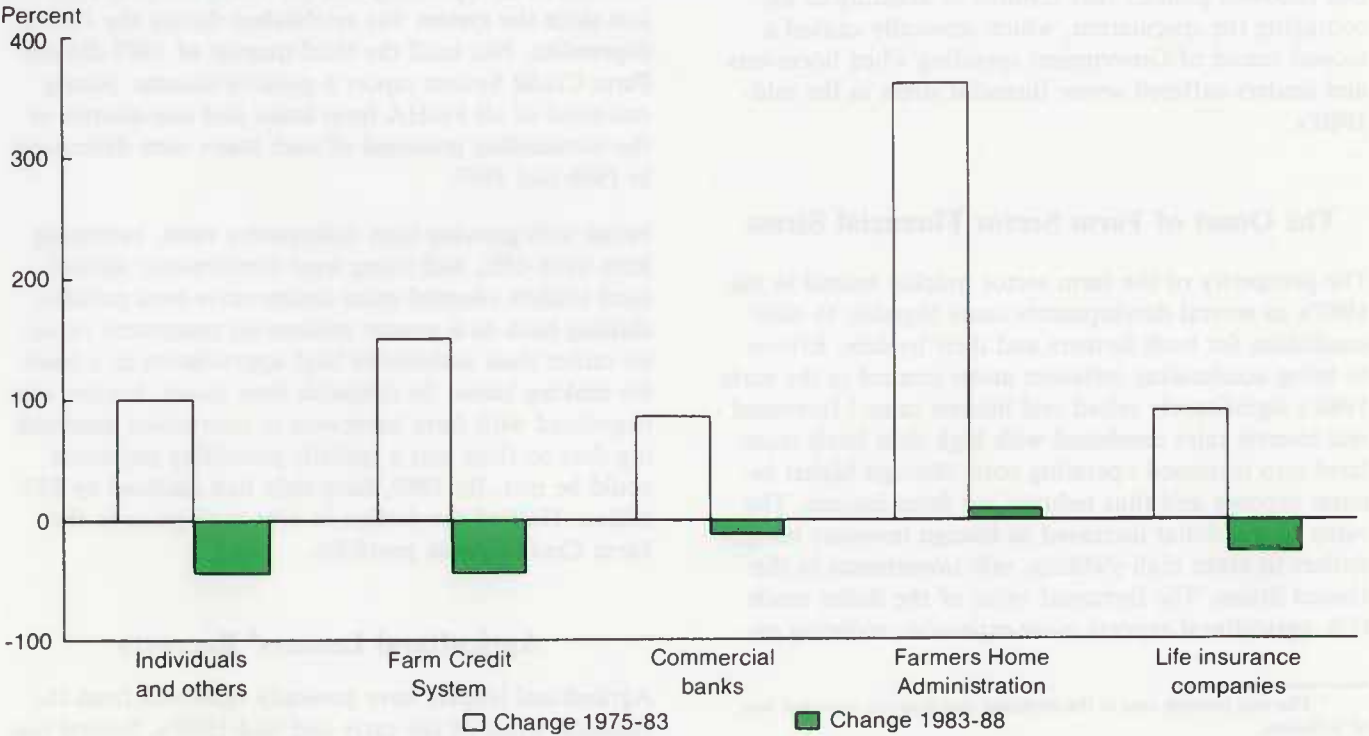


Figure 15

Farmers Home Administration and Farm Credit System expanded credit more than did other lender groups



such as land and machinery, and production inputs, such as fertilizer and farm chemicals. Debt grew faster than equity. The average debt/asset ratio stood at 7.3 percent in 1945, peaked at 22.2 percent in 1985, then declined to 18 percent in 1988.

Borrowers' primary objective was to buy land. Other debt also increased to finance production on the acquired property. This trend is consistent with the observed decline in the proportion of farmers who were full tenants during the post-World War II period. As expected, younger producers were relatively more indebted as they attempted to increase their size of operation and degree of ownership.

The use of debt is directly correlated to farm size as measured by gross farm sales. Farms with \$500,000 or more in sales had an average debt/asset ratio of 36 percent in 1987, while those with less than \$10,000 in sales had a ratio of 14 percent. Farms which sold in excess of \$100,000 were 13.7 percent of all farms, yet carried over 63 percent of total farm sector debt. The 1.3 percent of farms selling in excess of \$500,000 carried 23.1 percent of the total sector debt.

The greater use of debt by larger farms is not necessarily a shift to higher business risk. If increases in debt are accompanied by realistic expectations about the true income potential from farming and enhance the efficiency of the farm, higher debt can reduce overall farm riskiness. However, debt used for more speculative purposes, such as the purchase of land for potential capital gains, proved more damaging. Government credit agencies followed policies that resulted in assisting or encouraging the speculation, which ironically caused a second round of Government spending when borrowers and lenders suffered severe financial stress in the mid-1980's.

The Onset of Farm Sector Financial Stress

The prosperity of the farm sector quickly soured in the 1980's as several developments came together to alter conditions for both farmers and their lenders. Efforts to bring accelerating inflation under control in the early 1980's significantly raised real interest rates.³ Increased real interest rates combined with high debt levels translated into increased operating costs through higher interest expense and thus reduced net farm income. The value of the dollar increased as foreign investors bought dollars to make high-yielding, safe investments in the United States. The increased value of the dollar made U.S. agricultural exports more expensive, reducing ex-

port levels and, therefore, farm income. The higher cost of importing from the United States encouraged foreign production, which further reduced demand for U.S. agricultural products. High real interest rates also made it more difficult for developing countries to repay their debts, so they also cut back on purchases of U.S. farm products. Together, these factors resulted in declining net farm incomes and an abrupt drop in land values, reducing the collateral land value below the outstanding balance of many loans.

By January 1, 1985, 4.6 percent of U.S. farmers were technically insolvent, and another 5 percent had debt/asset ratios of 70-100 percent. Nearly 30 percent of U.S. farms were in serious financial difficulties, with debt/asset ratios above the critical 40-percent mark.

Financial problems among lending institutions mirrored farm financial stress as the decline in both real net farm income and land values reduced farmers' repayment capacity. Because both real farm income and land values declined substantially, the effect on lending institutions was particularly severe. Delinquent farm loans rose from \$4.2 billion in 1980 (2.5 percent of total loans) to \$23.1 billion in 1986 (14.9 percent of total loans). Total loan losses peaked at \$3.8 billion in 1986.

Rates of return on both equity and assets fell for commercial banks specializing in farm finance. Agricultural banks accounted for about half of all commercial bank closures in 1985 and 1986. Farm Credit System loan loss reserves were inadequate to deal with actual loan losses. In early 1986, the Farm Credit System announced an operating loss for 1985, the first such loss since the system was established during the 1930's depression. Not until the third quarter of 1987 did the Farm Credit System report a positive income. Nearly one-third of all FmHA farm loans and one-quarter of the outstanding principal of such loans were delinquent in 1986 and 1987.

Faced with growing loan delinquency rates, increasing loan write-offs, and rising legal foreclosures, agricultural lenders adopted more conservative loan policies, shifting back to a greater reliance on repayment capacity rather than anticipated land appreciation as a basis for making loans. To minimize their losses, lenders also negotiated with farm borrowers to restructure outstanding debt so there was a realistic possibility payments could be met. By 1988, farm debt had declined by \$53 billion. Half of the decline in debt took place in the Farm Credit System portfolio.

Agricultural Lenders' Recovery

Agricultural lenders have generally recovered from the financial stress of the early and mid-1980's. Several ma-

³ The real interest rate is the nominal rate less the expected rate of inflation.

major changes in the agricultural lenders' operating environment have occurred as a result of the 1980's farm financial experience.

Bank Loan Performance

Commercial banks with a heavy commitment to agricultural lending were hard hit by the farm sector downturn. From 1983 through 1988, 289 agricultural banks failed.⁴ As of mid-1988, an additional 63 agricultural banks were classified as weak, down from 197 at the peak in June 1986.⁵

Legislative and regulatory initiatives during the 1980's affected commercial banks generally and agricultural banks specifically. The Depository Institutions Deregulation and Monetary Control Act of 1980, the most important legislation affecting banks, phased out deposit interest rate ceilings (Regulation Q). Removing this regulation increased competition for funds and raised explicit deposit costs. Competition after deregulation affected even the previously relatively isolated agricultural banks, adding to the stress created by the downturn in farming.

Several regulatory changes were made to assist agricultural banks in particular during the farm financial crisis. A policy of capital forbearance was instituted so that banks meeting certain conditions could continue to operate with capital levels below normal regulatory minimums. The Federal Reserve's seasonal borrowing privilege program was enhanced to assist agricultural banks. Accounting procedures were changed so that renegotiated loans did not erode bank capital, although income was forgone. Loan writeoffs, which previously had to be absorbed in the year they occurred, were extended over 7 years for qualifying banks.

Farm Credit System Loan Performance

The Farm Credit System (FCS) pursued an aggressive loan strategy in the 1970's and early 1980's. FCS used average cost pricing in setting loan rates which, in a period of rising nominal interest rates, gave them a temporary price advantage over lenders pricing at marginal cost of funds. Thus, the FCS portfolio expanded both in absolute terms and in market share as their low rates attracted farmer borrowers. FCS agricultural loans rose from \$11.7 billion in 1970 to \$64.5 billion in 1982.

The fortunes of the FCS were reversed with the fall of inflation and nominal interest rates, the rise in real interest rates, and the deterioration of farm borrower re-

payment capacity. Average cost pricing compounded problems of declining credit quality by making FCS loan rates no longer competitive for the best quality borrowers.

A decline in loan portfolio performance brought the FCS to the brink of insolvency and stimulated legislation designed to restore the system, the Agricultural Credit Act of 1987. The act provided for an assistance corporation through which a line of credit was made available to assist in the recapitalization of FCS. The act also initiated a series of steps for streamlining the system's organization and reducing operating costs. These and other provisions are still being implemented. The act also included the machinery for the creation of a secondary market for qualifying agricultural real estate and rural housing loans. The Federal Agricultural Mortgage Corporation, "Farmer Mac," is intended to provide an additional liquidity and risk management tool to agricultural lenders, and increase capital availability for farmers by allowing lenders to sell some loans, thereby reducing their risk exposure and increasing funds available to lend.

Insurance Company Loan Performance

Life insurance companies have traditionally provided a small share of total agricultural lending and have dealt almost exclusively in real estate. This small market share did not prevent them from experiencing the same decline in performance as other lenders, however. During the 1980's, the life insurance market share has fluctuated between 6 percent and 7 percent. Delinquencies as a percentage of total loans have been higher than for either agricultural banks or FCS and were at 13.3 percent in mid-1988, down from a peak of 19.9 percent in June 1986.

Farmers Home Administration Loan Performance

The FmHA has steadily and substantially expanded its market share over the past two decades. Its market share has risen from 5.9 percent (\$2.9 billion) in 1970 to 16.4 percent (\$22.8 billion) in 1988. FmHA's position is unique in that it is an explicitly Government agent and thus has goals not intended to maximize profits.

The original policy objective of FmHA was to provide temporary credit assistance to farmers with potential to succeed in private credit markets. With the onset of the farm recession in the early 1980's, the number of problem loans increased and substantial public concern arose over the effects of potential FmHA foreclosures on the farm sector. FmHA was encouraged to use forbearance so that land prices would not be depressed further. Regulatory and legislative actions were taken to keep farmers who had problem loans on the farm.

⁴ A bank is considered an agricultural bank if it holds a higher proportion of farm loans than the unweighted ratio of agricultural loans to total loans among all commercial banks.

⁵ A bank is classified as weak if total nonperforming loans (in arrears more than 90 days) exceed total capital.

These actions included the enactment of a multistage “borrower rights” package. The agency also moved toward loan guarantees versus direct lending to strengthen the FmHA loan portfolio.

Farm Credit into the Next Decade

Near-term prospects for farm credit availability look good, especially for low-risk borrowers. Lenders in general have excess lending capacity. But, agricultural borrowers can expect lenders to have cautious loan policies in which cash-flow is of primary importance.

Agricultural bank profitability has risen, as have bank capital levels. Agricultural bank failures are down. Bank loan/deposit ratios are rising slightly but remain quite low, reflecting the capacity for a significant increase in lending if credit quality merits it and demand is strong.

The FCS lending position has improved. Its most recent financial report indicated a return to profitability, albeit with a large contribution from transferring some loss reserves back into income. Consolidation within the system’s components is not yet complete, thus some operating cost reductions may yet be realized. Also, outstanding high-cost obligations are being refinanced at lower rates to cut interest expenses. FCS leadership has expressed an intention to recapture lost market share, which bodes well for increased competition among lenders and relatively lower rates for borrowers.

Insurance companies will probably continue to be cautious and very credit-quality conscious. They are still reducing inventories of properties acquired through foreclosures, and delinquencies are still quite high although declining. Their market share is traditionally small, but they will probably compete vigorously for high-quality real estate loans.

FmHA lending authority remains basically unchanged for the next year. However, more than any other lender, FmHA lending activity will depend upon legislative action. The agency will probably continue to move away from direct loans toward guaranteed loans.

Lending Climate More Cautious

Lenders will probably adopt more cautious lending policies that place more emphasis on creditworthiness. Careful evaluation of cash-flow potential will be balanced against collateral value in making lending decisions. Industry efforts to standardize financial statements will probably contribute to a better understanding of borrower characteristics by both borrower and lender. The introduction of the “Farmer Mac” secondary loan market should improve credit availability to

farmer borrowers by increasing lender liquidity and risk management options.

Changes in the structure of agriculture during the farm financial crisis have reduced the uniqueness of agriculture as a user of credit. A more dualistic structure with larger commercial farming operations (still largely family-owned) and smaller “life-style” farms supported by some off-farm income means more and more borrowers are similar to any reasonably sized business or to the household borrower. The move to standardize financial statements will also reduce the unique character of farmers as borrowers.

The events of the 1980’s have made the agricultural credit system more like other providers of credit. Financial markets are more efficient, and agriculture now will compete for funds in a more national rate environment. Lenders will probably have fewer opportunities to achieve “excess” returns, as occasionally happened in the more isolated markets of the past.

Risks the Future Holds

Several developments may create some surprises. A near-term repeat of the drought of 1988 could damage prospects for some lenders. Lenders, particularly agricultural banks, stood by borrowers during the recent drought. While the trend for most lenders is toward improved loan portfolio quality, a second year of drought could significantly alter banks’ ability to show forbearance.

Agriculture also may see another land boom similar to that of the 1970’s. As producers were discovering how far land prices and farm income could fall in the mid-1980’s, they also saw the degree to which the Government was willing to intervene in markets, both foreign and domestic, to restore farm incomes. Farmer confidence in strong Government support when events turn against them, current low stocks of some commodities, and strong current farm income could raise farmer expectations of good economic times and begin a new round of land acquisition.

Lenders are in a position to satisfy a significant expansion in credit demand by farmers. They, too, have seen evidence of Government’s willingness to provide assistance in times of poor performance, which could in turn increase lenders’ willingness to extend credit to their full capacity.

Two additional factors affecting specific lenders may contribute to aggressive lending behavior and another land boom; the flat-rate deposit insurance premiums to banks and the agency status of Farm Credit System securities. Because deposit insurance is not based on risk-

iness of bank loans, lenders may be more aggressive. Explicit Government backing of FCS securities allows the FCS to obtain loanable funds at lower rates than its competitors and reduces the incentive for management to control operating costs.

Longer term issues of concern include legal ramifications of such issues as pesticide residues, waste manage-

ment, ground water contamination, and the assignment of liability in actions against environmental standards violations. To protect themselves, some lenders are considering, or have incorporated, clauses covering those issues in loan contracts. An increased likelihood of lender liability could reduce credit availability to farmers.

Agricultural Technology Developments

John McClelland*

Technology affects the structure and performance of agriculture and continues to be a force driving increased agricultural productivity. Mechanization, chemical inputs, and hybrid seed technology are examples of developments that have changed the face of American agriculture. As we enter the 1990's, we find ourselves on the verge of another major technological revolution that could transform agriculture in ways we cannot yet imagine. Genetically altered plants that produce their own fertilizers and insecticides and are disease resistant could make agricultural chemicals a thing of the past. Genetically engineered animals that produce more meat with less fat using less feed could significantly reduce the cost and improve the quality of our dietary protein. Genetically altered cows could become the pharmaceutical factories of the future by producing compounds that now are difficult and prohibitively expensive to produce by conventional means. Biotechnology is and will continue to be a principal force in the new agricultural technology of the 21st century.

Although most products of the biotechnology revolution have not reached the market as rapidly as many observers had anticipated, two animal growth hormones may become available to farmers in the next 1-3 years. Bovine growth hormone (bGH) and porcine growth hormone (pGH) are not likely to severely disrupt the structure of livestock and dairy production. However, they are likely to reinforce other trends and forces that are already promoting greater productivity and increased efficiency. They will also probably encourage the trend toward fewer and larger commercial producers in the U.S. livestock sector.

Animal products provide U.S. farmers half of their total revenue derived from farming activities. About two-thirds of all farms are defined as livestock enterprises, meaning they derive more than half of their income from the sale of livestock products. Within the last 40 years, the livestock industry has undergone tremendous

technical change resulting in increases in both productivity and product quality. Though great progress has been made, technical change in animal agriculture has traditionally been viewed as gradual. Critics of growth hormones have asserted that the introduction of this technology will threaten the economic survival of small dairy and livestock producers because they will not be able to adjust to the major changes predicted by some initial studies.

Growth Hormones: What Are They?

Growth hormones, or somatotropins, are proteins produced naturally in the pituitary gland of many animals, including humans. In an effort to treat human dwarfism, scientists learned that injection of human growth hormone could stimulate the growth process. Initial studies with animals confirmed that injections of growth hormone would cause animals to grow faster, but research was stymied because the hormone was in limited supply and was expensive. The advent of recombinant DNA (rDNA) technology made it possible to produce large quantities of pure growth hormone at a comparatively low cost. Once this rDNA-derived hormone was available to animal scientists, the number of experiments on the effects of growth hormone on several livestock species increased rapidly. The hormone works by "repartitioning" nutrients from fat tissue production to meat or milk production. Although many species could eventually benefit from commercial applications of growth hormones, the most promising results to date have been achieved with dairy cattle and hogs.

Initial scientific studies showed extremely large increases in milk production from dairy cows, but further testing has suggested that onfarm gains will probably be modest. One early study with dairy cows found yield increases of as much as 40 percent, but this study was conducted with 18 animals for only 188 days and did not involve an entire lactation. Subsequent studies have produced 10- to 30-percent increases in milk yield per lactation under controlled conditions. Most experts agree that onfarm yield increases are more likely to be

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in the 10- to 20-percent range for the latter part of the lactation with an overall 6- to 12-percent increase on an annual basis.

Experimental trials of growth hormones in hog production indicate the potential for gains in animal growth rates, more efficient feed conversion, and an increased ratio of lean meat to fat. Hogs given daily injections of pGH have shown 10- to 25-percent increases in feed efficiency and 10- to 20-percent increases in growth rates. Again, farmers will probably not achieve results at the upper end of the scale because onfarm production conditions will not mirror the controlled experimental conditions of scientific trials.

A farmer adopting a growth-hormone strategy would probably not see gains as great as in experimental settings. Even such modest increases, however, would take several years to achieve through the breeding programs traditionally used to increase animal yields. For example, dairy yields have increased at an annual average rate of 2-3 percent. Achieving 12-percent increases implies that gains from 3-6 years of conventional breeding can be achieved in a matter of weeks. Thus, the growth hormones represent an advancement in animal production technology that improves growth rates and feed efficiency.

The economic decision farmers must make regarding the adoption of growth hormone goes beyond direct yield considerations. Growth hormones themselves are an added expense. To achieve some of the yield increase, high protein supplements are necessary which can increase feed costs, and administering the growth hormone requires additional labor. The added labor costs will have to be recovered through increased productivity and reductions in other inputs. Researchers at Cornell University have recently reported success with a sustained release injection for bGH that would substantially reduce the costs of hormone administration.

One of the main arguments expressing the concerns of some farmers and farm groups is that growth hormones will help large farmers more than small farmers, and that as a result, small producers of meat and dairy products will be forced out of business. Because the trend toward larger farms will probably continue, potential new technologies will be implicated as the cause by mere association. A new technology can lead to larger farms in three ways:

- A new technology may favor large operations if it can be purchased only in large units. New, larger tractors and other machinery may require a minimum acreage to justify the substantial investment. Growth hormones do not fit this description. If anything, they allow the same or more milk and meat production with fewer animals.

- Any successful new technology will favor producers who adopt it first, and one might expect that larger producers would be the first to do so. But, the evidence on who adopts new technologies first is mixed. Some studies have shown that the largest producers are somewhat averse to risk, and often wait and see if a new technology proves effective.
- Growth hormones increase milk production per cow and meat output per animal. Those farmers who use hormones and remain in business will probably continue to use their full production capacity, and thus their annual milk and meat production will rise. By this measure, the technology will increase farm size, but this outcome does not equate with harming small farms.

Effects of bGH on the Dairy Sector

Under current dairy policy, 1989 purchases of surplus dairy products probably reached about 8.9 billion pounds, roughly the same as in 1988. With greater milk production per cow from bGH, fewer cows will be needed to produce the same quantity of milk. However, if prices were allowed to adjust, a 16.5-percent decrease in price would be required to absorb a 14-billion pound (10-percent) increase in the quantity of milk produced. The number of cows in production will depend on the level of dairy price supports and Government purchases of surplus milk. According to ERS estimates, cow numbers would drop with bGH use from a current 10.5 million to 9.1 million by 1996 if the support price were \$8.60 per hundredweight. Cow numbers would increase with bGH use if a support price of \$11.10 remains through 1996. Cow numbers would decline without bGH use unless support prices remain at \$11.60 per hundredweight, but the decline is greater with bGH use. The current price support is \$10.60. The clear trend of increasing productivity in the U.S. dairy herd will require fewer cows. Use of bGH would accelerate that trend and put downward pressure on dairy support prices.

Changes in consumer demand for dairy products would probably not mitigate the effect of increased milk production. No factors have been identified that are likely to change consumer demand for fluid milk as supplies increase. The scientific literature reports no measurable change in the quality of milk produced by dairy cows treated with bGH; there will simply be more milk per cow. USDA estimates Government purchases will reach 31 billion pounds by 1996 if support prices remain at \$11.10 per hundredweight. If prices fall to \$8.60 per hundredweight, Government purchases would be less than 2 billion pounds. With changes in consumer de-

Table 8—Selected milk production data, by region, 1987

Item	Appalachian States	Corn Belt	North-east	Pacific States	Southeast	Southern Plains	Upper Midwest
<i>Head</i>							
Average herd size	74	54	57	322	388	128	49
<i>Hundredweight</i>							
Production per cow	127	129	143	168	122	131	135
<i>Dollars/hundredweight</i>							
Net returns	2.62	1.48	2.00	2.38	3.62	2.97	1.56
Feed costs	3.55	3.69	2.95	2.74	4.86	3.97	2.76
Hay costs	.69	.61	.64	2.15	.59	1.56	.94
Marketing	.59	.60	.77	.42	.85	.72	.55
Capital replacement	1.45	1.78	1.74	.67	1.19	.96	1.97
Gross value of production	13.47	12.41	12.90	11.65	15.61	13.70	12.10
Total economic cost	11.62	12.39	12.01	10.22	13.16	12.01	11.83

mand unlikely, the problem will remain one of supply management. Significant changes in U.S. dairy policy toward more flexible market-based pricing with an easing of marketing restrictions and fewer cows will probably reduce the number of dairy farms operating. But, which producers will be most likely to survive?

Selected costs of producing dairy products for farms in different regions of the country help illustrate the relationship between farm size and efficiency (table 8). The Pacific region has the highest average annual production per cow at 16,800 pounds and the second largest average herd size of any region with 322 cows per herd. The next most productive regions are the Northeast and upper Midwest with average annual production per cow of 14,300 pounds and 13,500 pounds. These yields are achieved on farms with an average of 50–60 cows. The Pacific region has a cost advantage of \$1.36 per hundredweight, about 14 percent, over the upper Midwest, suggesting some scale economies between these two regions. The least productive herds are located in the Southeast where annual production is 12,200 pounds per cow, but where herd size averages 388 cows, the largest of any region.

Many of the cost components in dairy production generally reflect the availability of inputs and climatic differences among geographic regions. For example, feed concentrate costs are \$2.74 per hundredweight of production in the Pacific region but \$4.86 per hundredweight of production in the Southeast region. Hay costs are \$2.15 in the Pacific and \$0.59 per hundredweight of production in the Southeast. Producers in the Pacific region feed large quantities of alfalfa which grows particularly well in the region. Dairy farmers in the Southeast feed poorer forage and more concentrates. High

capital replacement costs in the regions to the north, in part, reflect the need for winter housing of the animals. Another major explanation for the differences in net returns among regions can be found in the gross value of milk produced. The Southeast has a gross value per hundredweight nearly \$2 higher than the next highest value region, and more than \$4 above that of the Pacific region. Gross values reflect the benefits of Government price support and Federal milk marketing order policies, and are based on regional production costs. Farm size does not appear to be the dominant factor in determining these costs. Thus, the argument that large-scale producers are using a set of technologies and practices that give them a cost advantage over smaller producers in dairy production is difficult to fully support. There is, however, some evidence that large-scale, management-intensive producers in the Pacific region do have a cost advantage over other regions.

Effects of pGH on the Hog Sector

Recent change in the U.S. hog sector has been toward larger farms and more intensive management. Several vertically integrated firms have entered the industry. Entry of these firms indicates economies of scale in hog production. Table 9 lists selected costs and returns for five sizes of farrow-to-finish hog operations. Despite individual examples of excellent management and high profitability among all sizes of farms, cost of production data indicate the experience of an average farm of a certain size. Because management is so vital to the successful application of growth hormone technology, farmers' abilities and decisions will determine their profits.

Table 9—Selected hog farrow-to-finish production data by farm size, North Central and Southeast, 1987

Cost	Head per farm					
	140	300	650	1,600	3,000	10,000
<i>Pounds/hundredweight</i>						
Grain	355.30	353.60	353.30	345.80	348.20	336.60
Protein	80.60	80.40	85.70	85.00	79.00	77.60
<i>Dollars/hundredweight</i>						
Marketing	.56	.41	.41	.23	.23	.32
Capital replacement	8.62	8.10	7.01	7.16	6.03	5.05
Net returns	-1.37	5.15	7.44	8.11	10.59	12.83
Total economic cost per cwt	52.73	46.31	43.77	43.12	40.62	38.32

The data clearly show that larger farms are, on average, more efficient than smaller farms. Farmers with 140 head require 6 percent more grain per hundredweight produced than do farmers with 10,000 head. Larger farmers also require less protein supplement per hundredweight of production, and marketing costs are as little as half those of smaller producers. Capital replacement per hundredweight of production is also substantially lower for larger farms. Even a mid-sized farmer with 650 head has a capital replacement cost of \$7.01, or \$1.62 less per hundredweight of production than a 140-head farm. Returns to management and risk follow the same pattern, with a 10,000-head farm averaging \$14.20 more per hundredweight than a 140-head farm. These data indicate that the current package of management-intensive technologies and practices being used by large-scale hog farmers is significantly more cost efficient than the technologies and practices of small farmers on average. Growth hormone technology may not be scale biased, but it will be introduced into an economic environment that favors large, management-intensive production units.

Changes in the relative numbers of large versus small producers will ultimately depend on who adopts the technology first. The innovators will receive the greatest benefits. Use of pGH could accelerate and enhance the trend toward larger scale, management-intensive farms and vertical integration in the hog sector. However, growth hormone technology is not responsible for this trend, nor is it the only technology, present or future, that will continue to move the industry in this direction.

Concentration of production by fewer farms will probably not increase prices because these larger farms will produce at a lower cost per unit. Competition will remain strong among the remaining firms because others will enter the industry if excess profits are present.

Growth Hormones and Other Species

Experiments with growth hormone on other commercial livestock species have not produced encouraging results.

A few studies have administered growth hormone in lambs, chickens, or beef cattle. Much of the work with lambs has involved the group of repartitioning agents called beta-agonists. Poultry researchers have had disappointing results with all repartitioning agents. Research in poultry will probably go toward direct genetic engineering, without an effective repartitioning agent.

Beef producers have several anabolic steroids that are approved for use and have been an integral part of beef production for many years. At least one study used bGH in beef cattle. The results of this study were encouraging in that there was a marked increase in feed efficiency and growth rate, similar to those found in hogs. However, the production of beef is a much more complicated process than with other species, because it involves a long period of time on the range, followed by 6 months of feeding on a feed lot. Both price and effectiveness will determine how well a growth hormone will compete with currently available growth promotants in the beef industry.

Consumer Benefits

Consumers should benefit from the introduction of animal growth hormones. As with other new technologies, growth hormones will reduce the per unit cost of producing agricultural products. These cost savings should translate into lower prices for these products. The price of dairy products will also be determined by Government policy, but there will probably be pressure to lower milk prices from \$1 to \$2 per hundredweight, with or without bGH adoption. Adoption of bGH will probably hasten price declines, thus increasing consumer benefits.

Changes in the quality of pork from animals treated with pGH could help consumers both economically and from a health perspective. Studies have shown that pork from pGH-treated animals is leaner than meat from comparable untreated animals. If the technology is accepted by consumers and there is a perception that leaner pork is preferable to other meat products, de-

mand for pork and pork products would increase. Increased demand would, in turn, help pork producers. Therefore, pGH could both lower costs of production and increase demand for leaner pork products. Although foretelling price movements is difficult, leaner pork will probably be available at slightly lower prices.

International Competitiveness

Three countries—the Soviet Union, South Africa, and Czechoslovakia—have approved bGH for use in milk production. These countries may be trying to meet domestic demands, but their approval of bGH could significantly increase world supplies. The Soviet Union currently has 42 million head of dairy cattle with annual production at 233.2 billion pounds. A 10-percent increase in Soviet production would be almost 16 percent of current U.S. production, a substantial quantity of milk by any standard. While the European Community is considering banning the technology, some Eastern European countries welcome the opportunity to become self-sufficient in dairy production. As agricultural production in those countries becomes less state-controlled, more productive, and more market-oriented, they might become the new suppliers of low-cost dairy products to the world market.

Conclusions

Animal growth hormones are the products of a technology that will probably soon become available to Ameri-

can farmers. Although the growth hormones hold great potential for improving hog and dairy production, they are not likely to reshape either of those industries. Growth hormones will probably enhance changes that result from other forces at work.

The livestock industry is changing rapidly; dairy and hog farms are getting larger. Many of the forces behind this change are a product of exploitation of current technology, such as breeding and herd improvement programs. As markets develop, new forms of business organization, like vertical integration, may also advance the tendency toward larger farms. Because the industry is dynamic and affected by many forces and because of the nature of the technology, growth hormones alone will probably not cause major changes in the structure and performance of the industry. Changes that growth hormone technology brings to the dairy and hog industries will complement or hasten other changes already underway.

For additional reading . . .

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Macroeconomic Performance and Policies

John Kitchen and Ralph Monaco*

Farms operate in an economic environment largely determined by forces beyond the control of the farmer or even the agricultural sector as a whole. Foreign and domestic economic policies concerning exchange rates, interest and tax rates, and levels of Government spending help to determine agricultural prices, the volume of exports, and, ultimately, the profitability and strength of farms. Because a high percentage of farm income is from off-farm sources, macroeconomic policy that affects nonfarm rural industries and employment can affect the welfare of individual farms.

Agriculture and the Rural Economy in the Macroeconomy

Agriculture directly represents a small part of the rural economy and an even smaller part of the U.S. macroeconomy. Manufacturing is a much more important component of rural production, income, and employment than farming and mining. In the 1980's, farm businesses accounted for slightly more than 2 percent of total output as measured by the gross national product (GNP), and agricultural employment has been slightly less than 3 percent of total U.S. civilian employment. In the rural economy, farming accounted for about 5 percent of employment and income, manufacturing less than 25 percent, trade industries about 16 percent, and mining 3 percent.

The health of the agricultural and rural economy—and hence the farm—is affected by international macroeconomic developments and relationships. The U.S. farm and rural economies, because of their production and market characteristics, are somewhat more sensitive to macroeconomic and international economic forces that affect international trade than are other sectors of the economy. For example, agriculture plays a larger direct role in international trade than in the general economy. Agricultural products have accounted for nearly 17 percent of the value of U.S. merchandise exports in this decade.

The incomes of the United States and foreign countries and the rate at which the U.S. dollar can be converted into foreign currencies (exchange rates) are particularly important in determining the level of demand for agricultural and rural production. Exports from farming and other rural industries increase as foreign incomes rise and as the exchange value of the dollar falls. Also, as U.S. income rises, domestic demand for agricultural and rural products increases, and agricultural and rural employment rises.

Macroeconomic Policies

The Federal Government influences overall economic activity through its macroeconomic policies. These policies are intended to promote growth in income and production, while keeping prices stable and unemployment low. But because their goals focus on the general economy, macroeconomic policies often have unintended and potentially harmful effects on agriculture and the rural economy.

Macroeconomic policies are typically separated into two types: policies that involve spending, taxation, and other Federal budget issues (fiscal policies) and policies that directly affect interest rates, money, and credit flows in financial markets (monetary policies).

Fiscal Policies

The Government directly affects economic activity through its spending and tax activities. As Government spending increases, so do production and income. One measure of the direct effect is Government's share of all spending in the U.S. economy. In the 1980's, Federal, State, and local government purchases averaged about 20 percent of the goods and services produced each year. Federal Government purchases have averaged about 8–9 percent of gross national product (GNP). (Government purchases of goods and services do not include transfer payments, which are a large part of the total budget. Total Federal budget spending averaged about 24 percent of GNP in the 1980's.) Government can also target spending at specific industries or sectors, such as with Federal agricultural policies.

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Tax policies change economic behavior by inducing changes in spending and in production levels and patterns. As income taxes increase, the income available for personal use declines, and consumer spending and output tend to shrink. Furthermore, growth of tax revenues slows when the growth of output and income contracts. Taxes or tax benefits can also be directed at specific producers and sectors to either slow or enhance production. For example, accelerated depreciation schedules that reduce the tax burden for agricultural producers have, at times, promoted agricultural production and investment.

Since 1982, Federal expenditures have exceeded tax revenues. The resulting deficits have forced the Federal Government to borrow from private sources through financial markets. While economists debate the deficits' net effect, they agree the deficits were initially associated with strong real economic growth, rising imports, historically high interest rates, and a high exchange value of the dollar. Over the longer term, these deficits accumulate into a large public debt. Increasing debt suggests higher Federal debt service payments and either higher taxes or a lower level of Federal Government spending as a share of GNP to reduce the budget deficit.

Monetary Policies

The Federal Reserve Board initiates monetary policy to control the supply of money to the private sector by regulating bank reserve requirements, conducting open market purchases and sales of Government securities, and adjusting the discount rate charged to banks that borrow from the Federal Reserve. The Federal Reserve largely operates independently of the Federal Government, although it was created by Congress and its governors and chairman are appointed by the President.

The Federal Reserve periodically reviews the performance of the economy, paying particular attention to interest rates, exchange rates, and money and credit flows. Based on its assessment of the current and expected performance of the economy, the Federal Reserve adjusts growth in money and credit to promote high employment and stable prices. If pursuing this goal requires an expansionary policy—that is, taking steps to lower interest rates, increase loans, and accelerate the growth of production—the Federal Reserve can purchase Federal Government securities in an open-market operation. That purchase would increase the funds available for lending in the financial system. If the economy is expanding too rapidly and inflation is threatening, the Federal Reserve would try to reduce money and credit available to the economy. To implement such a restrictive policy, the Federal Reserve could sell Federal Government securities, reducing the funds in the system that are available for lending.

Implementing monetary policy is complicated by international constraints. World markets, particularly financial markets, have become increasingly integrated, and international trade and financial flows and exchange rates react to various monetary policies of the United States and other countries.

The combination of monetary and fiscal policies, that is, the policy mix, is also important. For example, in the early 1980's, the policy mix combined a restrictive monetary policy with rising Federal budget deficits. This mix raised both interest rates and the exchange value of the dollar.

Macroeconomic Policy Effects on Agriculture

With expansionary monetary policy, real interest rates (adjusted for inflation) and the exchange value of the dollar fall. Economic activity accelerates and the demand for agricultural products rises, both from domestic and international sources. Higher demand and lower real interest rates tend to drive up commodity prices, and real revenues for commodity producers increase. The fall in real interest rates reduces credit costs. Higher revenues and lower costs together increase real farm income, which increases input use and returns on machinery and farmland. As a result, farmers tend to increase production. This scenario generally describes the economic situation in the mid- to late-1970's.

Between 1973 and 1980, real prices received by farmers rose nearly 40 percent. Machinery use rose 10 percent, and fertilizer use rose nearly 30 percent. Farmland values increased 15 percent per year on average. At the same time, banks' real prime interest rate averaged just over 1 percent, and the exchange value of the dollar, though fairly stable between 1973 and 1976, fell about 17 percent between 1976 and 1980.

However, expansionary monetary policy and economic growth are usually associated with higher inflation, which drives up costs of inputs purchased outside the agriculture sector. Inflation rose during the 1970's. For example, average production costs in agriculture nearly doubled between 1973 and 1980, even though much of that increase can be attributed to energy costs which more than tripled over the period. Furthermore, although agriculture might initially benefit from expansionary monetary policies and the upward pressure on prices, experience suggests that efforts to stop inflation cause severe negative effects on agriculture.

Because macroeconomic policies are oriented toward the entire economy by design, the Federal Reserve, as it did in the early 1980's, sometimes implements a restrictive monetary policy to fight inflation, even though that

policy initially hurts agriculture and other primary commodity sectors. Under a restrictive monetary policy, real interest rates and the exchange value of the dollar rise, commodity prices fall, the domestic economy slows, and foreign and domestic demand slackens. In the early 1980's, higher interest rates increased interest expenses. Real farm income, returns to assets, input use, and farmland values fell.

Expansionary fiscal policy together with expansionary monetary policy could initially benefit agriculture and the rural economy. Economic activity and income would expand, thus promoting demand for agricultural and rural production. Monetary accommodation (in which the Federal Reserve provides sufficient funds to the banking system to meet increased demand for money) would hold down real interest rates and the exchange value of the dollar as it did in the late 1970's. A switch to a different mix of restrictive monetary policy and expansionary fiscal policy, as in the early 1980's, would raise real interest rates and the exchange value of the dollar and would tend to reduce commodity prices and increase interest costs. Such negative effects would offset and probably dominate any initial benefits the farm sector might receive from the increased economic activity associated with deficit spending under an expansionary fiscal policy.

We have a reasonable understanding of the shortrun effects of macroeconomic policy on agriculture, but our understanding of the effects of these policies over longer periods is less certain. For example, expansionary monetary policy could have substantial shortrun benefits but, in the long run, could reduce income and employment in the rural economy and the macroeconomy and hurt agriculture because of higher inflation and the policies used to fight it. A policy mix of deficit spending with restrictive monetary policy initially drives up real interest rates and the exchange value of the dollar, increasing imports and reducing exports. In the long run, however, a large trade deficit creates expectations of a falling dollar and an improving trade balance. These examples illustrate the difficulty of measuring long-term effects of macroeconomic policy. Whether agriculture and the rural economy appear to be made better or worse off because of a particular macroeconomic policy (or policy mix) depends on how long the full effects of the policy take to reveal themselves and what period is used in assessing costs and benefits.

The Outlook

The two dominant features of the macroeconomy in the 1980's were the large trade and Federal budget deficits. With the exchange value of the dollar rising nearly 50 percent between 1982 and early 1985, real net exports fell from \$26 billion in 1982 to -\$108 billion in 1985.

(Real net exports are exports of goods and services less imports of goods and services measured in billions of 1982 dollars.) At the same time, the annual Federal budget deficit rose from \$128 billion in fiscal year 1982 to \$221 billion in fiscal year 1986.

International meetings in late 1985 signalled a readiness of major developed nations to help bring down the high value of the dollar by altering their domestic monetary and fiscal policies. At the same time, the passage of the Gramm-Rudman-Hollings deficit reduction act in 1985 showed the consensus of U.S. policymakers to attempt to bring down the Federal deficit.

The increased willingness to deal with these imbalances has met with some success since 1985. By the beginning of 1988, the value of the dollar had fallen nearly 50 percent, roughly back to the 1980 level. The real net export deficit began improving in mid-1986. From its record high of \$152 billion in the third quarter of 1986, the real net export deficit fell to about \$65 billion by the third quarter of 1989. The Federal budget deficit also improved, falling to an estimated \$155 billion for fiscal year 1988 from \$221 billion in fiscal year 1986.

Since mid-1988, however, improvements in both the Federal budget and trade deficits seem to have slowed. The slide in the value of the dollar essentially stopped at the end of 1987, and the real net export deficit slid only another \$25 billion through the third quarter of 1989. The Federal deficit for fiscal year 1989 was about \$152 billion, only slightly lower than in fiscal year 1988. Although the fundamental forces driving the economy are probably aimed at correcting these large imbalances, progress will probably slow. Macroeconomic policies over the next several years will probably be aimed at an orderly unwinding of both problems.

This orderly unwinding will probably be complicated by the fact that the economy performed well enough in 1987 and 1988 to raise manufacturing plant capacity utilization and lower unemployment rates to levels not seen in over a decade. Higher inflation typically has been associated with higher levels of capacity utilization and low unemployment rates. These considerations force policymakers to more seriously consider the effects of their actions on inflation than they did when the economy was not so close to full capacity. For example, monetary policy actions taken in the second half of 1988 and early 1989 were aimed at heading off inflation (by increasing interest rates), but those actions also probably helped drive up the value of the dollar, which may have contributed to the stalling of improvements in the trade deficit.

Attempts to reduce the Federal budget deficit will cause offsetting effects. Declining Federal purchases will ini-

tially tend to slow the economy and disposable income growth. However, a declining Federal deficit should reduce upward pressure on real interest rates, allowing them to fall. Lower real interest rates could stimulate investment spending, offsetting some of the downward pressure from reduced Federal purchases. Lower real interest rates also should put upward pressure on commodity prices and land values, and downward pressure on the value of the dollar. From this perspective, the agricultural sector will probably benefit from a smaller Federal deficit. Falling interest rates reduce costs, higher commodity prices increase returns, and the weaker dollar should improve agricultural competitiveness in world markets. Domestic demand could rise more slowly, but this effect is probably small in relation to the benefits.

Most of these effects, however, depend on future monetary policy. If monetary policy remains relatively tight to head off inflation as the Federal deficit falls, real interest rates may not fall and the economy may not realize the benefits that would accompany falling real rates. Agriculture could then face slow growth in revenues and income without the benefit of lower interest

costs, higher commodity prices, and enhanced international competitiveness.

But, there are also dangers in a monetary policy that is too expansionary. Pushing real interest rates too low and allowing the value of the dollar to fall too quickly and too far could put substantial upward pressure on prices. An inflationary spiral might result. Although agriculture might initially benefit from such a spiral, the early 1980's experience with policies stopping inflation suggests that agriculture lands harder in the long run than many other sectors.

The experience of the last few years suggests that the Federal Reserve has had some success at running a middle course. Barring some unusual occurrence, such as another substantial oil price increase, the Federal Reserve will most likely maintain its middle course over the next few years. With the expected gradual decline in the Federal budget deficit and the middle course for monetary policy, agriculture and the rural economy should benefit from a more stable macroeconomic environment.

Exports and the Farm Sector

Richard M. Kennedy*

Agricultural exports are an outlet for a large share of U.S. agricultural production, making them crucially important to the financial condition of the U.S. farm sector. Exports represented about 18 percent of gross cash farm income in 1988, but the figure has ranged from 14 to 24 percent in the 1980's. U.S. crop exports in recent years have accounted for 25-40 percent of total crop area (table 10). Some crops are especially dependent on exports. For example, wheat exports often equal 50 percent of total wheat production and exceeded 75 percent in both 1987 and 1988 (table 11).

The swing from rapid growth in U.S. agricultural exports in the 1970's to a sharp contraction in 1982-86 dramatically changed the financial conditions of U.S. farmers. Farmers growing heavily exported commodities such as wheat, corn, soybeans, cotton, and rice benefited financially more than other farmers during the upswing. But, they also suffered more financial stress during the downswing. The extent to which U.S. agriculture competes successfully on world markets inevitably affects conditions in the sector itself. That success depends in part on how each country chooses to compete as defined by its trade policy.

Trade Policy Supports Domestic Policy

Agricultural trade policy in any country, including the United States, is designed to support the objectives of its domestic agricultural policy. Among the multiple aims of U.S. domestic policy are reasonable and stable farm income, adequate food and fiber for consumers at reasonable prices, stable producer and consumer prices for agricultural commodities, and limited Government and, therefore, taxpayer expenditures. U.S. objectives are not concerned with achieving a specific farm structure, but with assuring an operating environment that promotes the survival of well-managed, independent, owner-operated farms and ranches within competitive markets.

Domestic agricultural policy may lean in two opposite directions in attempting to achieve its objectives. Policy may tilt toward government intervention in domestic markets to produce results different from those the market would otherwise yield. Or, policy may minimize intervention and emphasize the achievement of more efficient, freer domestic markets, while accepting the results that markets bring. Governments that intervene heavily in domestic markets generally intervene extensively in international markets through trade policy.

Domestic agricultural policies in nearly all countries increasingly involve extensive intervention in domestic markets. This intervention has led to the widespread adoption of increasingly protectionist trade policies in the form of import restrictions and export subsidies. Some of these interventions are motivated by the incompatibility of domestic policy objectives with a market-oriented trading system, whether domestic or international. Others are motivated by the belief that intervention is justified because other countries' policies cause the international market to produce unfair results.

Growth of Protectionism

As protectionist national policies become more widespread, the more likely they will conflict with each other and lead to further proliferation of protectionist measures and disputes over them. For example, a nation may regard an expansion of its exports to be essential in maintaining domestic commodity prices and farm income at desired levels. However, those exports may face import restrictions in potential importing countries that wish to protect their farmers' income from foreign competition. Those exports may also face competition in more open import markets from subsidized exports of other competitors who are trying to achieve similar domestic farm income objectives. Thus, the original exporting country may decide that it cannot achieve the desired level of exports without itself adopting export subsidies or threatening retaliatory import restrictions.

Agricultural protectionism around the world has grown and led to increasingly serious conflicts among partici-

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Table 10—U.S. harvested area of crops and area used to produce export products ¹

Year	Total cropland harvested	Cropland planted to export products	Land for export crops as a share of total cropland harvested
	-----Million acres-----		Percent
1973	321	96	30
1974	328	99	30
1975	336	100	30
1976	337	97	29
1977	345	112	32
1978	338	114	34
1979	348	125	36
1980	352	137	39
1981	366	129	35
1982	362	113	31
1983	306	124	41
1984	348	96	28
1985	342	79	23
1986	325	96	30
1987	301	107	36

¹ Area includes seeds for crops and feed for livestock that are exported.

Source: *Agricultural Statistics 1988*, U.S. Dept. Agr.

Table 11—U.S. exports as a share of U.S. production

Commodity	1984/85	1985/86	1986/87	1987/88	1988/89
	Percent				
Wheat	54	38	50	75	79
Coarse grains	23	13	19	25	42
Corn	24	14	19	25	43
Cotton	48	15	69	45	40
Major oilseeds	30	32	36	37	31
Soybeans	32	35	39	42	36
Major protein meals	18	23	25	23	20
Major vegetable and margarine oils	20	18	14	21	18
Tobacco (unmanufactured)	35	40	46	40	39

Source: Foreign Agricultural Service Circular, July 1989, U.S. Dept. Agr., For. Agr. Serv.

pants in the international trading system. Concerns have been focused not just on the border measures that countries use to control trade, but also upon the appropriateness of the domestic policies that underlie their trade measures. Domestic policies have become increasingly vulnerable to criticism because of their contribution to agricultural surpluses, budgetary expenditures by taxpayers, and costs to consumers in addition to trade disputes. Policymakers have come to believe that significant reductions in protectionism at the border between countries are unlikely without substantial reform of agricultural policies within those countries.

The Multilateral Trade Negotiations and Agricultural Reform

Negotiators in the current round of multilateral trade negotiations (MTN) under the General Agreement on

Tariffs and Trade (GATT) are attempting to bring about a substantial and mutual move to more liberal, market-oriented agricultural policies, both on trade and domestic policies. The participants, including nearly all of the major agricultural trading nations, agreed in the April 1989 MTN Midterm Review that there was "a broad measure of consensus that agricultural policies should be more responsive to international market signals" and that "support and protection should be progressively reduced and provided in a less trade-distorting manner." They indicated that the primary long-term objective of the MTN is "to provide for substantial progressive reductions in agricultural support and protection sustained over an agreed period of time, resulting in correcting and preventing restrictions and distortions in world agricultural markets."

The scope of policies that may be negotiated in the MTN is very large. Past MTN's dealt almost exclusively

with border measures, and the negotiation of domestic policies was considered out of bounds. The current MTN for the first time formally recognizes that the relationship between domestic agricultural policies and agricultural trade policies is a legitimate subject of negotiation. The policies to be negotiated "encompass all measures affecting directly or indirectly import access and export competition." Those policies include not only traditional border measures such as import tariffs and nontariff restrictions such as import quotas, but also internal support measures even if they only indirectly affect trade. Domestic price and income supports are some of the domestic policies that could be eliminated or reduced. Waivers and exceptions to GATT rules, such as the so-called section 22 waiver that permits the United States to use otherwise prohibited import restrictions to defend domestic commodity support programs have been specifically mentioned as potentially subject to elimination. Direct budgetary assistance, other payments or assistance in support of exports, and export prohibitions and restrictions would also be subject to negotiation.

The Multilateral Trade Negotiations and U.S. Farm Policy

Which kinds of U.S. policies and programs are potentially subject to elimination or modification? Almost all programs could be interpreted as now lying provisionally on the MTN's bargaining table because of the broad definition of "all measures affecting directly or indirectly import access and export competition." The other participants in the negotiations face the same situation. Any policy that affects either national production or consumption can be interpreted as distorting trade because trade occurs when there is a difference between production and consumption. However, MTN participants will not agree until later which specific programs fit the definition.

Which kinds of U.S. programs could be continued or what new types could be initiated within the MTN framework? This question also remains to be answered in specific detail by the negotiators. Programs providing support that did not affect farmers' decisions dealing with production, investment, and marketing could, in principle, remain in effect. Such "decoupled" support presumably would be independent of the current and future levels of farmers' production, marketings, input use, and commodity prices. Farmers would decide what mix of crops to produce and what scale of operation to adopt based on market signals. The support going to farmers as a result of Government policies or policy transfer payments would provide no incentive to produce beyond ordinary market demands. Payments would be permitted as an income "safety net" for farmers in the case of natural disasters or other extraordi-

nary circumstances. Transitional farm income supports would be allowed for some agreed period as old supports were phased out. Some MTN observers have suggested that Government support of research, extension, inspection, and rural development will be exempted as negotiators search for ways to retain some policies considered beneficial, so long as the allocation of resources depends mainly on markets.

The U.S. programs receiving the most scrutiny from other participants in the MTN are those that provide the most support to producers and therefore potentially have the greatest trade-distorting effect. A measure of the value of transfers to producers resulting from the operation of various farm support programs is the producer subsidy equivalent (PSE). PSE's estimate the amount of subsidy that would be needed to compensate producers for eliminating Government programs such as price supports, supply controls, export subsidies, and import restrictions. PSE's include transfers resulting from direct payments to producers, market price supports, input subsidies, marketing subsidies, long-term subsidies, and other subsidies. All of the policies and programs creating these transfers could become the subject of bargaining in the MTN. The method for calculating the PSE does not, however, specifically indicate whether or to what degree a policy measure produces trade-distorting effects that would make it subject to negotiation.

The average annual value of such policy transfers in the United States was \$26.7 billion during 1982-86 for 12 commodities making up 71 percent of total receipts for all farm products (table 12). For seven commodities (sugar, dairy, rice, wheat, sorghum, barley, and corn), such transfers to producers were 25 percent or more of gross cash receipts (table 13). For five others (beef, soybeans, poultry, oats, and pork), the transfers were less than 10 percent.

Direct payments and market price supports provide the main form of income support for U.S. farmers (table 14). In recent years, about 80 percent of direct payments have gone to farms with cash receipts of over \$40,000. Direct payments have been primarily in the form of deficiency payments that represent the difference between target prices and loan rates for program commodities. Receipts from loans in return for commodities forfeited under commodity loan programs are also included, as were land diversion payments in past years. Direct payments are especially important for grain producers.

Market price supports can include a combination of domestic and trade measures. For example, support is provided to dairy and sugar by a mix of import restrictions (tariffs and quotas), Government purchases of dairy products, and nonrecourse commodity loans for

Table 12—Policy transfers to U.S. farmers, by commodity, marketing year

Commodity	1982	1983	1984	1985	1986	Average, 1982–86	Change, 1982–86
<i>Billion dollars</i>							
Dairy	9.0	8.3	11.0	10.3	10.4	9.8	1.4
Market price support	8.2	8.1	10.5	8.9	9.6	9.1	1.4
Corn	3.0	8.7	3.4	4.7	10.1	6.0	7.1
Direct payment	.8	7.2	1.8	2.7	8.0	4.1	7.2
Wheat	1.8	4.6	3.1	3.8	5.8	3.8	4.0
Direct payment	.7	3.3	2.1	2.5	4.4	2.6	3.7
Beef and veal	1.6	1.7	1.7	2.0	2.4	1.9	.8
Sugar	1.1	1.1	1.3	1.1	1.4	1.2	.3
Soybeans	1.0	.9	.7	1.0	1.2	1.0	.3
Sorghum	.4	1.4	.4	.7	1.1	.8	.7
Rice	.4	.7	.5	.9	1.1	.7	.7
Poultry	.3	.3	.4	.5	1.5	.6	1.2
Pork	.5	.5	.5	.6	.7	.6	.2
Barley	.2	.2	.2	.4	1.0	.4	.9
Oats	—	.1	—	.1	.1	.1	—
Total transfers	19.2	28.3	23.3	26.1	36.9	26.7	—

— = Less than \$0.05 billion.

Table 13—Policy transfers to U.S. farmers as a percentage of gross cash receipts, by marketing year

Commodity	1982	1983	1984	1985	1986	Average, 1982–86	Change, 1982–86
<i>Percent</i>							
Sugar	70.4	71.3	86.8	75.3	82.7	77.4	12.3
Dairy	48.4	44.9	63.4	54.8	58.9	53.9	10.5
Rice	23.8	46.4	31.9	52.2	71.7	45.2	47.9
Wheat	16.8	38.1	28.5	37.9	63.0	36.5	46.2
Sorghum	18.1	52.9	19.5	22.5	49.2	31.4	31.1
Barley	13.2	14.2	13.7	27.4	76.4	28.8	63.2
Corn	12.9	40.8	15.5	19.7	49.5	27.1	36.6
12 commodities ¹	17.3	25.6	21.6	23.9	35.8	24.6	18.5

¹ Totals for all commodities shown in table 12. Each of the commodities not listed here (beef, soybeans, poultry, oats, and pork) had a 1982–86 average of less than 10 percent.

Table 14—Policy transfers to U.S. farmers, by marketing year ¹

Category	1982	1983	1984	1985	1986	Average, 1982–86	Change, 1982–86
<i>Billion dollars</i>							
Direct payments	2.0	11.7	4.2	7.1	14.2	7.8	12.1
Market price support	9.7	9.6	12.2	10.8	13.4	11.1	3.8
Input subsidies	2.4	2.6	2.4	3.5	4.4	3.1	1.9
Marketing subsidies	1.0	.6	.6	.6	.6	.7	-.4
Long-term subsidies	1.4	1.4	1.5	1.5	1.4	1.5	—
Other subsidies	2.6	2.4	2.4	2.6	2.9	2.6	.3
Total policy transfers	19.2	28.3	23.3	26.1	36.9	26.7	17.7
Value of production and payments	111.3	110.4	107.7	109.2	103.1	108.5	-8.2
<i>Percent</i>							
Transfers as a percentage of receipts ²	17.3	25.6	21.6	23.9	35.8	24.6	18.5

— = Less than \$0.05 billion.

¹ Includes wheat, feed grains, soybeans, rice, sugar, dairy, beef, pork, and poultry.

² Total policy transfers, expressed as a percentage of gross receipts including payments.

sugarcane and sugar beets. Grain producers benefit from similar purchase and loan measures, but also find market prices enhanced by supply controls and export programs.

U.S. Trade Policies Responded to Other Governments' Interventions

The United States operates several programs designed to promote U.S. agricultural exports by overcoming specific types of obstacles. The export enhancement program (EEP) is intended to subsidize exports of U.S. farm commodities in markets where the United States believes it faces unfairly subsidized competition from competing exporters. The United States has stated that it is using the leverage of these subsidies to induce competitors to negotiate a more liberal trading system in which all participants would eliminate trade-distorting subsidies. The EEP has supported export sales of almost \$6 billion of U.S. agricultural commodities from its announcement in May 1985 until the end of fiscal year 1988. Wheat has accounted for almost 90 percent of the sales covered by EEP.

Another group of programs supplies U.S. farm products on concessional terms to countries which otherwise could not afford them. U.S. Government-financed concessional exports were equal to about 4 percent of all commercial U.S. agricultural exports in fiscal year 1987. These programs provide U.S. food aid to developing countries. Although these programs have not been included in the computation of PSE's, they will probably be the subject of negotiations as participants attempt to ensure that the programs do not affect commercial markets.

Public Law 480 of 1954 (Food for Peace, P.L. 480) has one component (title I) that supplies commodities financed by up to 40-year, low-interest loans, a portion of which may be forgiven (title III). Another component (title II) provides outright donations or grants of food to needy people abroad. Among the stated multiple objectives of P.L. 480 are humanitarian aims, surplus disposal, foreign market promotion, and enhanced U.S. national security. Although most P.L. 480 commodities are purchased on the commercial market, surplus food held by the Commodity Credit Corporation may be donated to the needy both here and abroad under section 416 of the Agriculture Act of 1949. Agricultural commodities are also shipped on concessional terms under the mutual security assistance program administered by the Agency for International Development.

Another group of programs guarantees repayment of private commercial credit extended to foreign buyers, nearly all in developing countries, with which to purchase U.S. farm products. Such buyers might otherwise

experience considerable, perhaps insurmountable, difficulties in obtaining credit. These programs provided guarantees for U.S. agricultural exports worth \$2.8 billion in fiscal year 1987. One program (GSM-103) guarantees credits for 3- and 10-year terms and is intended to aid countries that formerly depended on concessional imports but that are not yet sufficiently affluent to handle all imports on a fully commercial basis. A second program (GSM-102) guarantees against risk for more normal commercial transactions of under 3 years. The programs are also not covered by the PSE's, but negotiators will probably try to make sure that they provide no unfair commercial advantage.

Implications for the Future

A broad movement throughout the world toward more liberalized domestic agricultural markets and agricultural trade policies implies higher prices for most commodities in world trade and generally more stable prices in international markets. Farmers would face a more competitive trading environment in which income increasingly depended on economic rather than political factors. A more competitive environment would also arise if the United States were to move toward a more market-oriented domestic agriculture or toward lower levels of support for producers in the absence of substantial trade liberalization. The transition to greater market orientation would, however, be much easier if the major agricultural trading nations were to share in this movement.

Prices of agricultural commodities in world markets should theoretically fluctuate less in most years in a more liberal trading environment. Crop shortfalls in one country or region would be more easily offset by production in other regions and crops could move freely to the deficit area from areas with adequate production. The average adjustment by individual market participants would be expected to be less than when trade is greatly restricted. However, trade liberalization also implies smaller grain stocks in countries or regions such as the United States and the European Community than the substantial surpluses generated by domestic policies in the past. The United States, which carried 60 percent or more of world coarse grain stocks and about 30 percent of world wheat stocks in the mid-1980's, probably will carry substantially smaller stocks. Unless other countries pick up some of the stock burden previously carried by the United States, world price stability and food security could become more vulnerable to large, but infrequent, supply shocks such as those caused by the 1988 drought in North America.

The continuation of current protectionist policies both here and abroad carries the risk of escalating conflict and uncertainty in world markets as participants at-

tempt to transfer the costs of maintaining or adjusting their domestic policies to others. For a country like the United States, whose agriculture depends heavily on exports, world markets distorted by policies generate boom-or-bust cycles for U.S. exports. The economic well-being of less competitive farmers becomes heavily dependent upon the willingness of taxpayers and consumers to support farm programs. Thus, if U.S. agricultural policies isolate farmers from the need to adjust resource allocations in response to signals from world markets, future farm structure will depend heavily upon political decisions about what level of costs society is willing to bear to maintain the farm status quo.

For additional reading . . .

Nelson, F. "United States," *Agriculture in the Uruguay Round: Analyses of Government Support*. Staff Report AGES 880802. U.S. Dept. Agr., Econ. Res. Serv., Dec. 1988.

Sommer, J., and F. Hines. *The U.S. Farm Sector: How Agricultural Exports are Shaping Rural Economies in the 1980's*. AIB-541. U.S. Dept. Agr., Econ. Res. Serv., Sept. 1988.

Appendix table 1—Distribution of U.S. farms and farmland, by State and Census division, 1987

Area	Farms	Land in farms	Average size
	Number	Acres	
United States	2,087,759	964,470,625	462
New England	25,158	4,248,963	169
Maine	6,269	1,342,588	214
New Hampshire	2,515	426,237	169
Vermont	5,877	1,407,868	240
Massachusetts	6,216	615,185	99
Rhode Island	701	58,685	84
Connecticut	3,580	398,400	111
Middle Atlantic	98,324	17,176,943	175
New York	37,743	8,416,228	223
New Jersey	9,032	894,426	99
Pennsylvania	51,549	7,866,289	153
East North Central	364,872	86,618,368	237
Ohio	79,277	14,997,381	189
Indiana	70,506	16,170,895	229
Illinois	88,786	28,526,664	321
Michigan	51,172	10,316,861	202
Wisconsin	75,131	16,606,567	221
West North Central	497,110	263,849,468	531
Minnesota	85,079	26,573,819	312
Iowa	105,180	31,638,130	301
Missouri	106,105	29,209,187	275
North Dakota	35,289	40,336,869	1,143
South Dakota	36,376	44,157,503	1,214
Nebraska	60,502	45,305,441	749
Kansas	68,579	46,628,519	680
South Atlantic	239,687	51,199,309	214
Delaware	2,966	608,245	205
Maryland	14,776	2,396,629	162
Virginia	44,799	8,676,336	194
West Virginia	17,237	3,372,955	196
North Carolina	59,284	9,447,705	159
South Carolina	20,517	4,758,631	232
Georgia	43,552	10,744,718	247
Florida	36,556	11,194,090	306
East South Central	249,556	45,636,029	183
Kentucky	92,453	14,012,700	152
Tennessee	79,711	11,731,386	147
Alabama	43,318	9,145,753	211
Mississippi	34,074	10,746,190	315
West South Central	334,608	184,407,553	551
Arkansas	48,242	14,355,611	298
Louisiana	27,350	8,007,173	293
Oklahoma	70,228	31,541,977	449
Texas	188,788	130,502,792	691
Mountain	124,210	244,062,828	1,965
Montana	24,568	60,203,993	2,451
Idaho	24,142	13,931,875	577
Wyoming	9,205	33,595,135	3,650
Colorado	27,284	34,048,433	1,248
New Mexico	14,249	46,018,005	3,230
Arizona	7,669	36,287,794	4,732
Utah	14,066	9,989,073	710
Nevada	3,027	9,988,520	3,300
Pacific	154,234	67,271,164	436
Washington	33,559	16,115,568	480
Oregon	32,014	17,809,165	556
California	83,217	30,598,178	368
Alaska	574	1,026,732	1,789
Hawaii	4,870	1,721,521	353

Source: 1987 Census of Agriculture, Advance State Reports.

Appendix table 2—U.S. farms by size, State, and Census division, 1987

Area	1 to 9 acres	10 to 49 acres	50 to 179 acres	180 to 499 acres	500 to 999 acres	1,000 acres or more
<i>Number</i>						
United States	183,257	412,437	644,849	478,294	200,058	168,864
New England	2,751	5,981	8,605	6,086	1,425	310
Maine	419	1,029	2,453	1,758	474	136
New Hampshire	255	567	919	583	160	31
Vermont	281	834	1,800	2,320	559	83
Massachusetts	1,105	2,125	2,016	813	126	31
Rhode Island	131	250	241	66	11	2
Connecticut	560	1,176	1,176	546	95	27
Middle Atlantic	8,138	19,927	39,003	24,636	5,365	1,255
New York	2,517	6,114	12,991	12,244	3,112	765
New Jersey	1,862	3,549	2,316	939	292	74
Pennsylvania	3,759	10,264	23,696	11,453	1,961	416
East North Central	24,260	65,621	128,067	100,497	34,652	11,775
Ohio	6,007	16,688	32,074	17,718	5,072	1,718
Indiana	5,444	15,010	24,892	15,902	6,670	2,588
Illinois	5,931	12,971	23,824	26,720	14,320	5,020
Michigan	2,866	12,174	19,779	11,329	3,667	1,357
Wisconsin	4,012	8,778	27,498	28,828	4,923	1,092
West North Central	29,083	52,242	124,700	149,255	78,602	63,228
Minnesota	4,613	9,481	24,947	30,963	10,814	4,261
Iowa	7,974	10,981	27,556	39,071	15,874	3,724
Missouri	4,960	17,028	37,413	30,423	11,413	4,868
North Dakota	876	1,596	3,025	6,148	8,637	15,007
South Dakota	1,881	2,638	5,083	8,625	7,618	10,531
Nebraska	5,090	4,296	11,166	17,320	12,153	10,477
Kansas	3,689	6,222	15,510	16,705	12,093	14,360
South Atlantic	23,168	66,533	85,687	43,064	13,302	7,933
Delaware	514	867	788	481	188	128
Maryland	1,838	4,400	4,885	2,591	712	350
Virginia	3,408	10,753	17,530	9,252	2,624	1,232
West Virginia	643	2,689	8,081	4,518	1,004	302
North Carolina	5,253	18,088	22,680	9,337	2,676	1,250
South Carolina	1,337	5,437	7,742	3,762	1,303	936
Georgia	2,875	10,953	15,602	8,868	3,197	2,057
Florida	7,300	13,346	8,379	4,255	1,598	1,678
East South Central	21,943	62,512	100,547	46,182	11,877	6,495
Kentucky	10,648	20,707	38,261	17,920	3,618	1,299
Tennessee	7,306	23,209	32,266	12,697	2,906	1,327
Alabama	2,602	12,356	16,514	7,776	2,469	1,601
Mississippi	1,387	6,240	13,506	7,789	2,884	2,268
West South Central	20,751	64,719	105,796	73,133	34,705	35,504
Arkansas	2,249	9,723	17,551	11,173	4,371	3,175
Louisiana	2,066	7,799	8,248	4,811	2,602	1,824
Oklahoma	3,666	10,134	22,331	18,006	8,405	7,686
Texas	12,770	37,063	57,666	39,143	19,327	22,819
Mountain	15,999	22,080	22,479	19,775	12,856	31,021
Montana	1,940	2,745	3,019	3,315	2,737	10,812
Idaho	3,021	5,268	5,685	4,716	2,446	3,006
Wyoming	795	989	1,356	1,536	1,091	3,438
Colorado	2,725	4,352	5,111	4,862	3,355	6,879
New Mexico	2,421	2,710	2,164	1,846	1,341	3,767
Arizona	2,158	1,510	1,133	910	678	1,280
Utah	2,365	3,835	3,437	2,137	941	1,351
Nevada	574	671	574	453	267	488
Pacific	37,164	52,822	29,965	15,666	7,274	11,343
Washington	6,040	11,362	7,216	3,796	1,855	3,290
Oregon	5,476	11,448	7,219	3,617	1,560	2,694
California	22,697	28,498	15,017	8,028	3,804	5,173
Alaska	96	113	172	97	24	72
Hawaii	2,855	1,401	341	128	31	114

Source: 1987 Census of Agriculture, Advance State Reports.

Appendix table 3—Value of agricultural products sold, land and buildings, and machinery and equipment, for U.S. farms, by State and Census division, 1987

Area	Value of sales	Sales per farm	Value of land and buildings		Market value of machinery and equipment per farm
			Per farm	Per acre	
	\$1,000		Dollars		
United States	136,048,516	65,165	289,387	627	41,227
New England	1,624,070	64,555	312,657	1,851	37,888
Maine	405,484	64,681	210,777	962	38,325
New Hampshire	107,102	42,585	358,279	2,112	33,905
Vermont	375,537	63,899	258,713	1,124	46,090
Massachusetts	340,464	54,772	346,530	3,553	32,039
Rhode Island	37,786	53,903	420,279	4,748	35,918
Connecticut	357,702	99,917	467,677	4,171	36,996
Middle Atlantic	6,015,386	61,179	245,912	1,408	44,143
New York	2,441,860	64,697	218,934	993	49,087
New Jersey	496,003	54,916	396,198	3,969	37,768
Pennsylvania	3,077,523	59,701	239,333	1,579	41,641
East North Central	21,333,496	58,468	263,914	1,112	49,685
Ohio	3,434,064	43,317	227,341	1,199	39,979
Indiana	4,067,684	57,693	265,446	1,158	44,502
Illinois	6,376,801	71,822	402,970	1,262	60,935
Michigan	2,545,078	49,736	196,065	971	45,954
Wisconsin	4,909,869	65,351	182,950	826	54,037
West North Central	36,299,620	73,021	265,087	499	50,427
Minnesota	5,676,376	66,719	218,808	700	55,741
Iowa	8,926,799	84,872	283,597	947	52,844
Missouri	3,644,988	34,353	175,612	640	28,432
North Dakota	2,188,158	62,007	366,475	319	77,505
South Dakota	2,719,498	74,761	326,333	269	55,005
Nebraska	6,667,132	110,197	344,253	457	58,799
Kansas	6,476,669	94,441	278,047	413	50,411
South Atlantic	14,878,122	62,073	270,706	1,267	31,729
Delaware	443,575	149,553	369,751	1,765	53,447
Maryland	989,061	66,937	366,788	2,261	44,656
Virginia	1,588,770	35,464	232,374	1,198	30,249
West Virginia	270,639	15,701	130,802	682	17,482
North Carolina	3,541,419	59,737	199,781	1,263	30,403
South Carolina	878,683	42,827	201,169	871	31,252
Georgia	2,814,592	64,626	226,217	920	32,477
Florida	4,351,383	119,033	543,830	1,790	34,799
East South Central	7,464,413	29,911	155,519	850	24,898
Kentucky	2,075,571	22,450	135,696	896	22,670
Tennessee	1,617,636	20,294	146,126	1,001	22,700
Alabama	1,908,303	44,053	168,161	800	25,831
Mississippi	1,862,903	54,672	215,209	697	34,900
West South Central	17,924,219	53,568	311,045	564	31,416
Arkansas	3,320,258	68,825	225,604	761	34,505
Louisiana	1,340,162	49,000	268,630	940	38,323
Oklahoma	2,714,892	38,658	215,024	480	29,465
Texas	10,548,907	55,877	374,742	544	30,351
Mountain	11,193,538	90,118	506,439	258	49,594
Montana	1,547,286	62,980	505,526	205	60,754
Idaho	2,269,404	94,002	336,615	572	55,327
Wyoming	676,721	73,517	533,284	147	45,709
Colorado	3,143,131	115,201	458,906	369	49,534
New Mexico	1,060,112	74,399	582,012	180	33,093
Arizona	1,628,544	212,354	1,317,765	279	55,702
Utah	617,882	43,927	302,838	425	35,685
Nevada	250,458	82,741	749,936	227	52,474
Pacific	19,315,647	125,236	475,704	1,091	45,876
Washington	2,919,634	87,000	355,976	739	45,905
Oregon	1,846,067	57,664	299,755	542	37,982
California	13,922,234	167,300	583,668	1,575	49,223
Alaska	17,972	31,309	553,000	309	38,901
Hawaii	609,740	125,203	603,435	1,707	41,208

Source: 1987 Census of Agriculture, Advance State Reports.

Appendix table 4—U.S. farms by value of agricultural products sold, State, and Census division, 1987

Area	Less than \$2,500	\$2,500– \$4,999	\$5,000– \$9,999	\$10,000– \$24,999	\$25,000– \$49,999	\$50,000– \$99,999	\$100,000 or more
<i>Number</i>							
United States	490,296	262,918	274,972	326,166	219,636	218,050	295,721
New England	8,225	3,221	2,766	2,672	1,853	2,537	3,884
Maine	2,059	870	719	700	466	553	902
New Hampshire	1,020	371	320	234	131	175	264
Vermont	1,523	589	480	453	446	992	1,394
Massachusetts	2,167	830	720	770	494	515	720
Rhode Island	290	79	82	79	41	55	75
Connecticut	1,166	482	445	436	275	247	529
Middle Atlantic	25,004	11,859	11,433	12,347	8,649	13,031	16,001
New York	9,168	4,061	3,892	4,426	3,337	5,560	7,299
New Jersey	3,089	1,281	1,163	1,201	632	578	1,088
Pennsylvania	12,747	6,517	6,378	6,720	4,680	6,893	7,614
East North Central	62,834	38,115	44,960	61,609	46,441	50,019	60,894
Ohio	17,263	10,489	11,664	14,689	8,953	7,678	8,541
Indiana	12,433	8,072	9,515	12,820	8,682	8,031	10,953
Illinois	10,630	6,741	8,728	14,962	13,313	14,765	19,647
Michigan	12,670	6,774	7,548	8,460	5,002	4,322	6,396
Wisconsin	9,838	6,039	7,505	10,678	10,491	15,223	15,357
West North Central	63,133	41,454	55,543	90,347	77,661	80,800	88,172
Minnesota	11,915	6,509	8,293	13,588	12,983	15,385	16,406
Iowa	8,799	5,498	8,252	17,436	17,752	20,656	26,787
Missouri	23,075	15,353	17,881	20,749	11,212	8,943	8,892
North Dakota	2,260	1,750	2,982	6,817	7,725	7,808	5,947
South Dakota	2,888	2,020	3,190	6,764	7,026	7,706	6,782
Nebraska	4,694	3,405	5,515	10,923	10,681	11,305	13,979
Kansas	9,502	6,919	9,430	14,070	10,282	8,997	9,379
South Atlantic	76,208	36,981	33,824	32,115	16,863	14,224	29,472
Delaware	540	270	297	280	214	257	1,108
Maryland	4,165	1,948	1,881	2,012	1,100	1,084	2,586
Virginia	13,622	7,995	7,580	6,895	3,028	2,102	3,577
West Virginia	7,977	3,463	2,547	1,781	583	400	486
North Carolina	16,758	8,461	8,344	8,515	4,817	4,271	8,118
South Carolina	7,419	3,516	2,900	2,547	1,276	954	1,905
Georgia	13,176	6,460	5,805	5,320	3,012	2,883	6,896
Florida	12,551	4,868	4,470	4,765	2,833	2,273	4,796
East South Central	78,022	46,238	43,564	38,804	16,102	10,912	15,914
Kentucky	24,380	16,421	17,620	18,078	7,880	4,527	3,547
Tennessee	27,451	16,106	14,398	11,446	4,127	2,719	3,464
Alabama	15,082	7,726	6,534	5,210	2,324	1,956	4,486
Mississippi	11,109	5,985	5,012	4,070	1,771	1,710	4,417
West South Central	98,607	53,930	52,624	50,293	24,428	20,469	34,257
Arkansas	12,130	7,609	7,101	6,088	2,885	3,329	9,100
Louisiana	9,283	4,021	3,448	3,050	1,776	2,063	3,709
Oklahoma	18,501	11,073	11,999	12,805	6,300	4,479	5,071
Texas	58,693	31,227	30,076	28,350	13,467	10,598	16,377
Mountain	31,082	12,742	13,651	18,594	14,400	13,884	19,857
Montana	4,320	2,006	2,374	3,912	3,695	4,064	4,197
Idaho	5,329	2,519	2,627	3,646	2,781	2,787	4,453
Wyoming	1,987	766	977	1,497	1,241	1,154	1,583
Colorado	6,607	2,582	3,008	4,245	3,316	3,117	4,409
New Mexico	5,104	1,802	1,700	1,828	1,234	966	1,615
Arizona	2,494	820	775	757	583	533	1,707
Utah	4,380	1,894	1,854	2,272	1,272	1,005	1,389
Nevada	861	353	336	437	278	258	504
Pacific	47,181	18,378	16,607	19,385	13,239	12,174	27,270
Washington	10,599	4,166	3,507	3,684	2,668	2,995	5,940
Oregon	11,751	4,785	3,770	3,697	2,194	1,972	3,845
California	23,187	8,661	8,512	11,028	7,863	6,895	17,071
Alaska	242	92	73	65	38	25	39
Hawaii	1,402	674	745	911	476	287	375

Source: 1987 Census of Agriculture, Advance State Reports.

Appendix table 5—U.S. farm operators' principal occupation and days worked off farm, by State and Census division, 1987

Area	Principal occupation is farming		Worked any days off farm		Worked at least 200 days in year	
	Operators	Share of all operators	Operators	Share of all operators	Operators	Share of all operators
	Number	Percent	Number	Percent	Number	Percent
United States	1,138,179	54.5	1,115,560	53.4	737,206	35.3
New England	13,496	53.6	13,738	54.6	8,659	34.4
Maine	3,220	51.4	3,653	58.3	2,253	35.9
New Hampshire	1,153	45.8	1,539	61.2	959	38.1
Vermont	3,762	64.0	2,695	45.9	1,598	27.2
Massachusetts	3,174	51.1	3,516	56.6	2,283	36.7
Rhode Island	345	49.2	395	56.3	262	37.4
Connecticut	1,842	51.5	1,940	54.2	1,304	36.4
Middle Atlantic	56,954	57.9	49,581	50.4	32,276	32.8
New York	22,977	60.9	17,596	46.6	11,506	30.5
New Jersey	4,180	46.3	5,375	59.5	3,666	40.6
Pennsylvania	29,797	57.8	26,610	51.6	17,104	33.2
East North Central	212,799	58.3	189,527	51.9	126,497	34.7
Ohio	39,569	49.9	46,025	58.1	32,749	41.3
Indiana	36,654	52.0	40,682	57.7	28,153	39.9
Illinois	57,122	64.3	43,651	49.2	26,001	29.3
Michigan	26,112	51.0	29,155	57.0	20,818	40.7
Wisconsin	53,342	71.0	30,014	39.9	18,776	25.0
West North Central	332,924	67.0	229,952	46.3	135,571	27.3
Minnesota	58,519	68.8	39,567	46.5	22,006	25.9
Iowa	75,279	71.6	46,229	44.0	25,928	24.7
Missouri	53,694	50.6	58,409	55.0	40,925	38.6
North Dakota	29,031	82.3	13,137	37.2	5,295	15.0
South Dakota	28,407	78.1	13,553	37.3	6,641	18.3
Nebraska	45,387	75.0	24,403	40.3	13,099	21.7
Kansas	42,607	62.1	34,654	50.5	21,677	31.6
South Atlantic	112,414	46.9	135,250	56.4	96,054	40.1
Delaware	1,774	59.8	1,426	48.1	955	32.2
Maryland	7,882	53.3	7,985	54.0	5,504	37.2
Virginia	20,617	46.0	25,826	57.6	18,291	40.8
West Virginia	7,201	41.8	10,083	58.5	7,278	42.2
North Carolina	30,687	51.8	31,914	53.8	21,702	36.6
South Carolina	8,983	43.8	11,791	57.5	8,549	41.7
Georgia	19,449	44.7	25,029	57.5	18,426	42.3
Florida	15,821	43.3	21,196	58.0	15,349	42.0
East South Central	103,705	41.6	149,666	60.0	107,752	43.2
Kentucky	41,451	44.8	54,464	58.9	37,893	41.0
Tennessee	30,745	38.6	48,882	61.3	36,187	45.4
Alabama	16,398	37.9	26,899	62.1	20,154	46.5
Mississippi	15,111	44.3	19,421	57.0	13,518	39.7
West South Central	154,442	46.2	195,050	58.3	133,892	40.0
Arkansas	24,210	50.2	26,208	54.3	18,417	38.2
Louisiana	13,496	49.3	14,388	52.6	9,202	33.6
Oklahoma	33,052	47.1	40,839	58.2	28,495	40.6
Texas	83,684	44.3	113,615	60.2	77,778	41.2
Mountain	73,462	59.1	65,156	52.5	38,923	31.3
Montana	17,405	70.8	10,764	43.8	5,607	22.8
Idaho	14,550	60.3	12,614	52.2	7,555	31.3
Wyoming	5,953	64.7	4,674	50.8	2,640	28.7
Colorado	16,504	60.5	14,202	52.1	8,311	30.5
New Mexico	7,243	50.8	8,137	57.1	4,937	34.6
Arizona	3,782	49.3	4,423	57.7	2,997	39.1
Utah	6,350	45.1	8,688	61.8	5,834	41.5
Nevada	1,675	55.3	1,654	54.6	1,042	34.4
Pacific	77,983	50.6	87,640	56.8	57,582	37.3
Washington	17,654	52.6	18,561	55.3	12,330	36.7
Oregon	15,359	48.0	18,897	59.0	12,646	39.5
California	41,906	50.4	47,085	56.6	30,948	37.2
Alaska	248	43.2	369	64.3	182	31.7
Hawaii	2,816	57.8	2,728	56.0	1,476	30.3

Source: 1987 Census of Agriculture, Advance State Reports.

Appendix table 6—Value of U.S. agricultural exports assisted by export programs¹

Programs	Fiscal year 1986				Fiscal year 1987 ²			
	Credit guarantees			Concessional programs	Credit guarantees			Concessional programs
	GSM-102	GSM-103	Total		GSM-102	GSM-103	Total	
\$1,000								
Livestock products	108,367	723	109,090	171,877	149,691	10,412	160,103	102,402
Poultry meat	0	0	0		38,876	0	38,876	0
Tallow	93,960	0	93,960	18,833	98,272	0	98,272	18,860
Cheese	0	0	0	22,547	0	0	0	12,978
Milk, nonfat	0	0	0	95,023	0	0	0	54,476
Anhydrous milk fat	0	0	0	29,036	0	0	0	11,529
Wheat and products	933,745	0	933,745	841,648	693,122	105,542	798,664	602,188
Wheat, unmilled	878,118	0	878,118	640,927	616,338	99,842	716,180	480,301
Wheat flour	55,627	0	55,627	118,222	72,880	5,644	78,524	97,743
Bulgur wheat	0	0	0	82,499	0	0	0	24,144
Rice	154,876	0	154,876	93,838	137,654	0	137,654	86,477
Coarse grains	412,193	0	412,193	128,622	535,573	0	535,573	114,405
Corn	371,603	0	371,603	38,284	477,502	0	477,502	63,592
Grain sorghum	40,210	0	40,210	5,763	55,005	0	55,005	1,064
Corn meal	0	0	0	18,353	0		9,746	0
Corn-soya milk	0	0	51,288	0	0		0	33,240
Feeds, fodders	1,912	0	1,912	108	8,359	0	8,359	383
Oilseed products	520,640	0	520,640	155,812	576,599	11,487	588,086	195,413
Cottonseed oil	9,093	0	9,093	16,170	1,087	0	1,087	3,169
Protein concentrate	5,196	0	5,196	0	17,497	11,487	28,984	0
Soybeans	227,318	0	227,318	0	324,652	0	324,652	9,911
Soybean oil	85,738	0	85,738	133,257	21,669	0	21,669	173,320
Soybean meal	51,774	0	51,774	0	130,446	0	130,446	7,199
Sunflower seeds	52,952	0	52,952	0	37,239	0	37,239	0
Sunflower oil	79,381	0	79,381	3,014	32,453	0	32,453	1,524
Cotton	176,412	0	176,412	11,860	265,465	0	265,465	21,487
Tobacco	42,444	0	42,444	0	74,779	26,387	101,166	0
Other	61,846	0	61,846	59,211	149,669	0	149,669	14,099
Beans, dried	17,864	0	17,864	3,768	83,011	0	83,011	8,697
Sugar	27,791	0	27,791	0	43,588	0	43,588	123
Vegetable seeds	9,711	0	9,711	39,240	9,849	0	9,849	1,189
Total ³	2,412,435	723	2,413,158	1,462,976	2,590,911	153,928	2,744,739	1,136,854

¹ Based on exporters' reports to the Foreign Agricultural Service. Thus, values may not completely reflect exports made under these programs.

² Preliminary.

³ Excludes lumber, leather, and wood pulp

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